NEWSPAPER

On-Line Lit — Can You 'Bear' It?

By Jeffry Beeler
CW Staff

IRVINE, Calif. — If you know anything about data processing, you've probably already heard about electronic music and computer art. But did you know that mainframes have begun to enter yet another realm of artistic endeavor?

If not, brace yourself. The age of computer literature is upon us.

Of course, on-line lit is still a long way from cracking the bestseller list, and no one expects great poetry to start flowing from the world's DP rooms right away. Indeed, computers may never take their place alongside Shakespeare and Tolstoy in the ranks of history's great writers.

On the other hand, one of the first experiments in computer literature is already well under way at the University of California here, and although the results thus far are still admittedly a little primitive, they are almost sure to improve in stylistic quality during the next few years, according to Dr. James R. Meehan, who ought to know.

Two years ago Meehan, now an assistant professor in the university's information and computer science department, began developing a story-writing program dubbed "Tale-Spin" as part of his doctoral dissertation at Yale.

Today, the program is "teaching" a 75K-byte Digital Equipment Corp. PDP-10 at the university's computing center to fashion fictional vignettes

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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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And Warned to Watch Language

Memos Show IBM Brass Told to Launder Files

By Catherine Arnst
CW Staff

NEW YORK — Top IBM executives were told to "launder" their files after the Justice Department began investigating the firm for antitrust violations, according to government charges made here.

The IBM legal department also instructed the IBM executives to change the way they characterized the industry after the antitrust investigation began, the Justice Department contended.

The government reached these conclusions after studying several documents that IBM has been attempting to keep out of the public record in the U.S. vs. IBM case for almost nine years.

The documents have just been entered into evidence after all the IBM moves to bar them from the government — including two appeals to the appeals courts and one to the Supreme Court — have been rebuffed.

The documents show that IBM had "guilty knowledge' of its power in the computer marketplace and that "IBM's highest corporate officials recognized IBM's monopoly power in 1966 and undertook by laundering the language of such officials to minimize the likelihood of detection and liability," the Justice Department said.

In addition to laundering then-current files, the IBM executives were told to watch their language in the future and warned to "avoid references to the inexperience or naivete of IBM's customers or to their dependence on IBM," among other things.

One of the documents, dated Nov. 6, 1970 and circulated in IBM's Data Processing Division (DPD) headquarters, described a request from the Department of Justice for information regarding the pricing of the 2319 disk

(Continued on Page 6)

Laced With Dissension

EFT Commission Delivers Report

By E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — After almost two years and $2 million, the National Commission on Electronic Fund Transfers (EFT) has issued its final report with more of a whimper than a bang

Throughout its one-year, nine-month history, the commission has dribbled out portions of the report, making the 389-page document more of an anticlimax than a culmination.

Furthermore, almost one-third of the working portion of the report is composed of sharp dissents from commission members unhappy with the document's conclusions (see story on Page 5).

The dissenters charged the commission with leaving "unfinished business," not doing the job it was established to do, making "inconsistent" recommendations and generally failing to come to grips adequately with consumer issues.

The report itself begins by stating that EFT systems can make "conventional consumer financial transactions simpler, more convenient and potentially less costly.

"EFT could also increase the security of these transactions by reducing the risk of theft of currency or checks and the unauthorized use of checks. Moreover, EFT may be able to serve low-income households that today do not have an account relationship with a depository institution," the report said

Finds No Harm Yet

In its most basic recommendation, the commission — having "found no evidence that EFT has yet caused harm to financial markets, financial institutions or consumers" — said "the appropriate approach to these new financial service concepts is, in general, to permit their further evolution in a relatively unconstrained way."

However, the group did find "some instances" where existing law and regulation might not be adequate and recommended some actions in the following areas: consumer interests, developmental issues in EFT, technology and the role of the federal government.

Having stated EFT would be good for consumers, the commission later noted it learned "that many consumers are reluctant to accept many EFT concepts. Some consumer concerns may

(Continued on Page 4)

Boston Arson Victims Push For Fire Prediction System

By Jeffry Beeler
CW Staff

BOSTON — A rash of suspicious fires here and in surrounding communities has prompted a citizens group to seek funding for a computer system that proponents say would predict when a building is likely to fall victim to an arsonist's torch.

If implemented, the anti-arson computer would become the first of its kind anywhere, according to Ernest Garneau of Greater Boston Community Development, a municipal agency assisting the system's development.

Dubbed Housing Early Warning System (Hews) by its supporters, the proposed system has already gained the endorsement of several local political leaders and public officials including the state fire marshal. Efforts to underwrite the arson-prevention program are being spearheaded by members of the Symphony Tenants Organization Project (Stop), which has contacted several federal agencies in an attempt to secure a $180,000 grant to develop the system.

Stop members proposed the system in response to an epidemic of 35 suspicious fires that plagued this city's

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On Five Levels

Work on Protocols Seen Advancing

By Ronald A. Frank
CW Staff

CW at Interface

LOS ANGELES — The new generation of protocol standards is developing at five different levels, all of which are important to users, according to James W. Conard, manager of engineering in the Communications Systems Division of Control Data Corp.

Even at Level 1, which is the electrical and mechanical interface, a standard is evolving that will require adapters to be used by customers. The new standard is known as RS-XYZ and it will replace the familiar RS-232 on data terminal equipment, Conard told attendees of a session on data communications architecture at the Interface West conference here last week.

One of the major differences in the RS-XYZ standard is the use of a 37-pin connector. This requires the installation of an adapter to convert from the familiar 25-pin RS-232, and some of these are beginning to appear, Conard said.

Changes are also taking place at Level 2, which deals with the link protocol. This level includes data flow initialization, control termination and error recovery procedures.

In this area, the American National Standards Institute (Ansi) is working on the Advanced Data Communications Control Procedure (ADCCP), which eventually will be designated X3.66. The International Standards Organization (ISO) is studying a link-level protocol known as Higher Level Data Link Control (HDLC), which is composed of four standards: IS 3309, IS 4335, DP 6159 and DP 6256, he said.

Still within Level 2, the CCITT has called its Link Access Protocol X.25, while the European Computer Manufacturers Association (ECMA) works with HDLC. The U.S. government is adopting ADCCP as Federal Standard 1003.

To provide further variations within Level 2, American manufacturers including IBM, Burroughs Corp., NCR Corp. and Control Data Corp. are coming out with their own link protocol standards. Other vendors are working on their own link protocol standards, Conard said.

Within Level 3, the virtual call standards are being developed to handle network management, block or packet structure and message format questions in networks. Within X.25, considerations are under way dealing with call setup and clearing; data and interrupt; flow control and reset; and restart procedures. Although X.25 has been adopted by the CCITT as an overall standard, work is still underway to refine various aspects of it, Conard told the attendees.

At the higher levels 4 and 5, the picture becomes less definitive and work is just starting. Level 4 deals with system protocol and includes packet or message assembly and disassembly; priorities and codes. Work on the packet assembly/disassembly (PAD) falls within this level.

Level 5 is the most indefinite of all since this will deal with the user application protocol concerning user-level programs, operators and device dependency questions.

One of the criteria that makes levels 4 and 5 difficult to define is that somewhere in this area, the transition is made from data communications to data processing. This question in itself raises separate legal and regulatory questions.

Within Level 5, the trend toward distributed data bases has to be taken into account, according to Dan Zatyko, director of distributed computing systems with Basic/Four Corp.

The new bit-oriented protocols will make it possible for both batch and inquiry/response transactions to be handled on the same line. Problems of data base synchronization among multiple processors arise at this level, Zatyko told the session.

In the evolving systems, it will be possible to remove many functions from the main DP center and place them in various remote processors in the network, he said.

Encryption Chip Validated

WASHINGTON, D.C. — The National Bureau of Standards (NBS) has validated a microprocessor chip implementing the Federal Data Encryption Standard.

The chip, made by Rockwell International's Collins Group, is the first commercial implementation of the standard to be accredited by the bureau.

One of the validation tests consists of 12 million enciphering and deciphering operations using random data and keys, NBS said. The NBS certification allows the manufacture and sale of identical devices to federal agencies desiring to use the standard.

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True, our new sort is not going to be too popular on Nob Hill in Armonk, where the Rich Hardware Merchant is already having enough trouble trying to marry off a somewhat aging debutante named 5740-SM1, Release 3. (Maybe you should have called it "Diane," IBM.)

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EFT Commission's Final Report Anticlimactic

(Continued from Page 1)

result from a lack of experience with these new ideas, but others are well founded."

In the privacy arena, for example, the commission found present safeguards "are not adequate to deal with the threats to privacy that may arise with EFT:"

But the commission did not propose any legislation for protecting privacy, recommending only that "government should minimize the extent to which, first, it requires an institution to maintain or report records generated by an EFT system and, second, it requires information to be collected by an EFT system that is not required as a matter of sound business practice.

"It also recommends that EFT systems not be used by government for surveillance, to learn either a consumer's physical location or his patterns of behavior."

However, the commission would allow law enforcement bodies to gain access to the records. In most instances this would call for a subpoena that could be contested by the individual whose record was sought, but the door was left open in certain cases for law enforcement officials to access records first and notify the data subject later.

As to private-sector access to information in an EFT system, the commission recommended (by "unanimous voice vote in favor, except for one negative vote," in the commission's words) that "information concerning an individual that is collected or generated by an EFT system ... should be treated as confidential by the individual's depository institution ... and should not be disclosed to third parties except with the specific consent of the individual, or as otherwise provided in the exceptions noted below."

The exceptions allow credit grantors, credit bureaus and credit authorization services to access information on an EFT user's credit standing. Furthermore, an EFT system could be used to track down the new address of someone who had a bad debt at an older address.

In one of its few concrete legislative recommendations, the commission did recommend that the Fair Credit Reporting Act be amended to ensure that its provisions — giving consumers the right to see and correct their records when denied credit — cover EFT systems.

In other areas of consumer concern, the commission advocated the enactment of legislation to "require institutions to mail or deliver statements to consumers for any month in which an EFT transaction takes place."

At the same time, however, such statements "would not be required where preauthorized credit transactions are the only electronic items on an EFT account."

The commission also feels there is no need "at this time to legislate the right to stop or reverse EFT payments," as a consumer can presently do by stopping payment on a check.

It did recommend, however, that the consumer not be liable for his account if a bank card is stolen or lost, unless the bank can prove the accountholder had written his personal identification number (PIN) on the card or otherwise kept the PIN with the card.

Branch Banking

In one of its few startling recommendations, the commission called for state and federal laws governing branch banking to be set aside when terminals instead of brick-and-mortar buildings are used.

The commission would allow banks to offer debit services anywhere in the country through terminal systems and would permit the immediate expansion of deposit-taking services statewide and then "across contiguous state lines to serve natural market areas.'

In other words, users with a debit card from a New York bank would be able to use that card in California if the New York bank had a terminal there; a New York bank could expand its deposit-taking activities into places such as New Jersey, Connecticut and Pennsylvania if these were construed as "natural market" areas for the bank.

Most banks presently are limited to doing business within their home state.

In the area of security, the commission played down consumers' concerns about the security of their financial records in EFT systems, but did recommend that state and federal regulatory agencies develop uniform security regulations and that "all state and federal financial institution regulators should consider joint solutions to common problems of security supervision."

It also backed the legislation proposed by Sen. Abraham Ribicoff that would place heavier penalties on computer criminals than in the past.

On-Line Lit: No Threat to Shakespeare

(Continued from Page 1)

whose characters and events bear a reasonable likeness to those in the real world. During the next few years, Meehan hopes to refine Tale-Spin even further to produce stories comparable in quality and effect to Aesop's fables.

Starts With Problems

Tale-Spin bases its stories on problems it gives its main characters and then generates events from the characters' attempts to solve those problems.

If, for example, a character is given the problem of hunger, the program, which is written in an Algol-like language called MLIFT, creates dramatic actions that allow the individual to find and obtain food.

The mechanism responsible for devising solutions to character problems is called the problem solver. Tale-Spin also incorporates two other active components — an assertion mechanism and an inference mechanism.

The assertion mechanism contains basic knowledge about the world, including facts about problem solving, relationships between people, character traits, bodily needs and story structure. It then files this knowledge as needed in a DEC RK04 disk drive unit.

The inference mechanism in turn determines all the possible consequences of each fact, Meehan added.

Working together, the three active components combine the basic narrative building blocks — fact, inference and problem — to form finished stories.

The result is a model of human behavior that Meehan claimed can help psychologists test current theories of how people solve problems.

"What we have devised is really a different approach to the study of human psychology," Meehan explained.

How reasonable a character's actions are depends in part on the completeness of the information Meehan programs into the computer.

When given all the facts it needs, Tale-Spin creates narratives like the following piece entitled "Joe Bear and Jack Bear":

"Once upon a time, there were two bears named Jack and Joe, and a bee named Sam. Jack was very friendly with Sam but very competitive with Joe, who was a dishonest bear.

"One day, Jack was hungry. He knew that Sam Bee had some honey and that he might be able to persuade Sam to give him some. He walked from his cave, down the mountain trail, across the valley, over the bridge, to the oak tree where Sam Bee lived. He asked Sam for some honey. Sam gave him some.

"Then Joe Bear walked over to the oak tree and saw Jack Bear holding the honey. He thought that he might get the honey if Jack put it down, so he told him that he didn't think Jack could run very fast.

"Jack accepted this challenge and decided to run. He put down the honey and ran over the bridge and across the valley. Joe picked up the honey and went home."

Sometimes, however, Meehan unintentionally omits a vital fact from his program, with unexpectedly humorous results:

"One day Joe Bear was hungry. He asked his friend Irving Bird where some honey was. Irving told him there was a beehive in the oak tree. Joe threatened to hit Irving if he didn't tell him where some honey was."

Although Irving Bird had answered Joe Bear's question, the computer "didn't realize" that fact because it had not been informed that honey comes from beehives, Meehan said. After he added the missing data to the program, the computer rewrote the story with a happier ending:

"One day Joe Bear was hungry. He asked his friend Irving Bird where some honey was. Irving told him there was a beehive in the oak tree. Joe walked to the oak tree. He ate the beehive."

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Also Cite Group's Makeup

Unhappy EFT Commissioners Hit Time Lack

By E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — The members of the National Commission on Electronic Fund Transfers (EFT) unhappy with the group's final report have painted a picture of a commission dominated by business interests and so rushed for time that it was unable to fully evaluate the options before it.

The time factor is the common thread in all the dissents, whch make up almost one-third of the working portion of the report released last week, just one year and nine months after the commission's first meeting.

Verne S. Atwater, representing the mutual savings banks, spoke of "unfinished business" in the report; Fairfax Leery Jr., a public representative, wrote that some decisions were made without adequate research and other issues were not researched at all because of time constraints; the General Accounting Office representative, Donald L. Scentlebury, charged some of the recommendations "are not supported by adequate study or discussion"; and four other dissenters said they were "quite disappointed that the pressure of time prevented careful deliberation" of certain issues before the Commission.

While many of the report's sections were criticized in the dissenting opinions, the report's stands on consumer issues — particularly privacy and security of records in EFT systems — were hit hardest.

This was largely because "organized consumers, the poor, minorities, civil libertarians and small business ... were not directly represented," according to Albert A. Foer, the Federal Trade Commission's representative to the commission. "Each could have made a valuable contribution.

"In theory, of course, each could have attached well-informed lobbyists to the commission — as did many major financial institutions, corporations and trade associations — to make certain its interests were understood at every juncture. This was not done."

Because so many important groups were not represented, Foer said, "no one should misconceive the deliberations of the commission to be those of a mini-Congress."

'Rhetoric, Not Achievement'

Foer was particularly critical of the commissions work in the privacy area, calling it "far stronger in rhetoric than achievement."

While noting the commission did recommend that EFT not be used for surveillance purposes, Foer pointed out the commission did not recommend any enforcement provisions.

On the privacy side, Foer criticized the commission for recommending that debt collectors be allowed to use EFT systems in order to trace people with outstanding debts and said additional measures are needed to regulate this use of EFT.

Foer also noted that the report would allow credit grantors to refuse to tell a person why credit was denied at the point of the transaction.

"The report would authorize such notices to be given orally at the point of transaction or 'in writing at a location designated by the institution.' This is an open invitation to abuse," he claimed.

In the security area, Foer said the report "fails to acknowledge, unfortunately ... that the current fears of system compromise are very much justified.

"Focusing narrowly on past incidents in which the unauthorized penetration of electronic systems resulted in losses that were 'small' and on security problems that were 'not difficult to correct,' the report concludes both that EFT systems are potentially more secure than current paper-based funds transfer systems and that 'technical and procedural solutions to virtually all security problems are currently available.'

"The evidence does not entirely support the commission's optimistic approach to the security question," he contended.

Didn't Do Its Job

Fairfax Leary Jr., professor of law at the Delaware Law School of Widener College, charged "the commission has just not done the job it was established to do.

"The report contains no draft legislation, yet it recommends much legislation. Experience tells us that many issues do not surface until one gets down to the nitty-gritty of drafting details.

"Thus, recommendations that are expressed in high-sounding generalities break down when detailed application is sought," he added.

In the area of accuracy of information, the commission "misses a point," Leary said. "The law of credit reporting is founded on the law of defamation and, in most states, there is a conditional privilege protecting the communication of false information if believed to be accurate.

"It is high time that the antique privilege to spread untruths be abolished. Credit agencies are big business. They can afford to dispense only accurate information to legitimate recipients or pay the piper," he said.

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Documents Clash in Account of IBM Meeting

By Catherine Arnst
CW Staff

NEW YORK — IBM's alleged laundering of its files may have reached the highest precincts of the company, according to documents recently entered into evidence by the government in its now almost nine-year-old antitrust suit against the firm.

The minutes of the Management Review Committee, one of the highest IBM decision-making groups, were edited for public view, two documents now in the public record show.

"The view of senior IBM management that IBM's paper machines had an anticompetitive purpose and effect was kept out of IBM's corporate records," the government charged.

Both documents were labeled as the minutes of the Management Review Committee meeting of Sept. 2, 1965, but they are vastly different.

The first, which was freely handed over to the government when it was investigating the firm, indicated that "Davis also reported on the publication of [Control Data Corp.] President [William] Norris' remark to financial analysts wherein he claimed harrassment because of our changes in 360 models. Davis and [T. Vincent] Learson were asked to prepare a position paper on this matter."

But the unedited version, which IBM has claimed is a privileged document, goes much further. It reads:

"The Control Data (CDC) annual report was next discussed. This report blames CDC's declining earnings on IBM and its frequent model and price changes. There was some sentiment that the charges were true ...

"[Al] Williams felt that the company had overreacted to DP's pessimism and that IBM had on occasion reduced profit to such a point that it left no room for competition to breathe.

"[Then-chairman of the board Thomas J.] Watson Jr. made the point that when our products were inferior, we should be particularly cautious about attempting to cure that defect by price cutting."

In defending the differences between the two documents, IBM attorney Ronald Rolfe stated in court that these minutes do not purport to be verbatim transcripts of the proceedings of a Management Review meeting.

Bostonians Want Antiarson DP

(Continued from Page 1)

Symphony Road section and several other Boston-area communities between 1973 and 1976. Those fires caused several deaths and an estimated $6 million in property damage and sparked perhaps the most intensive arson investigation in the nation's history.

Led by Assistant State Attorney General Stephen R. Delinsky, the probe thus far has netted 121 indictments against 33 persons who investigators allege were involved in a highly lucrative arson-for-profit scheme with possible organized-crime connections.

Those indicted on charges ranging from arson to fraud to murder included lawyers, real estate operators, a retired State Police detective lieutenant — and the former head of the Boston Fire Department's Arson Squad.

Arson-for-Profit Pattern

Local officials propose to use the Hews computer to maintain data files on as many as 150 of Greater Boston area's office and apartment buildings. In this computerized file, they will store information on factors like property values, mortgages, ownership transfers and tax abatements.

From recent studies of the Symphony Road fires, private investigators here have observed that a pattern involving these and other factors accompanies the typical arson-for-profit conspiracy. That pattern usually begins when a building targeted for burning falls into general disrepair with little or no attempt to halt the deterioration.

Next, the deed to the property passes through several hands in quick succession, with the landlords sharply hiking the building's selling price — and its insurance coverage — during each exchange.

Finally, when the structure has become sufficiently decrepit and almost if not entirely vacant, the conspirators typically recruit a professional arsonist and attempt to settle their insurance claim after the resulting blaze.

By monitoring the data base for evidence of this telltale pattern of activity, authorities here hope to identify arson-for-profit conspiracies in their early stages and abort the crimes before they result in costly and possibly fatal fires.

Proponents claim the Hews computer could pinpoint potential arson targets with almost 90% accuracy, and Garneau estimated the system could cut the city's arson rate by 40% to 50% if effectively deployed.

Garneau has written and sent grant applications for the system to several federal agencies, including the Department of Housing and Urban Development, the National Fire Prevention and Control Administration (NFPCA) and the Community Services Administration.

Memos Told IBM Brass to Launder Files

(Continued from Page 1)

drive.

That memo was quickly followed by another, dated Dec. 11, 1970, directing company executives to "clean out our files" on the 2319 "in accordance with legal advice."

Another memo, this one from H. Bartow Farr Jr., general counsel for DPD, said "one of the few legitimate ways to 'manage' leasing company activity is to introduce new technologies."

The Oct. 24, 1966 memo noted, however, that "much of the advantage from that subtlety is dissipated by file emphasis on leasing company activity as a or the motivating force behind any product improvement program."

But perhaps the bedrock document for the "laundering" operation was a memo from Farr to Frank Cary, then vice-president and group director for business planning at DP Group headquarters.

The 1966 memo stated that "to create a file record of improper or suspect objectives is dangerously unnecessary. As I have said before, confining these objectives to confidential files is of no help whatever. Expressing the same thought with different words is no solution either."

The memo continued with Farr's review of the DP Group's marketing objectives and some of the "problems" he found with those objectives.

In regard to the goal that "the IBM net position percentage will not be significantly lower than the previous year," Farr said: "If you have to mention the subject at all and cannot be satisfied with a revenue or profit growth objective, use 'preventing disrupting deterioration of market position.'

"While I realize you won't like this version much, I believe you will dislike it less than I dislike the other," Farr told Cary.

The DP Group also wanted to ensure that "IBM maintain present installed postion in prestige accounts in each industry segment" and that "the largest processor installed is IBM in [three] major government scientific projects plus 10 of the leading universities.

"While these objectives are not clearly objectionable," Farr said, "it would appear that they can only be achieved by suspect means (e.g., buybacks, selective pricing, extra SEs or other sales incentives)."

List of Don'ts

IBM also maintained a "list of points to be kept in mind when reviewing long-range plans and other internal IBM documents or proposed business decisions" pertaining to the Department of Justice Investigation. That list, dated July 9, 1968, was found in the files of Cary while he was still vice-president of the DP Group.

Under the topic of market share, firm members were cautioned not to "restrict discussions of IBM computer manufacturer competitors to the eight major companies ('seven dwarfs' plus SDS) . . . Expand on the classes of IBM's competitors, e.g. leasing companies and other owners of IBM machines, manufacturers of peripheral equipment . . . avoid loose, inaccurate or unnecessary documents which talk about IBM's market share, either as a whole or in any segment of the market . . . avoid predictions of a stable or increased market share for IBM . . . avoid references to large customer investments in programming or any other factors which might point toward a 'lock-in' of IBM's installed customers . . . avoid references to the inexperience or naivete of IBM's customers or to their dependence on IBM."

Under the heading "Performance," the memo suggested IBM executives not "make unnecessary comparisons of profit levels among different IBM products" and should "emphasize the DP industry's past history of rapid innovation and decreasing costs to the customer."

Under "Behavior," IBMers were told to "avoid post-mortems, case studies and other discussion of the System/360 announcements or subsequent price changes . . . Avoid pricing and related actions which are designed to maintain or increase market share at the expense of profit . . . take occasion to record any "fallout" from the Model 90 or its technology . . . Don't boast about any superiority IBM enjoys in the technology or manufacture of its components or about any unique advantages IBM enjoys by making its own components . . .

"Don't concede, even indirectly, an ability on the part of IBM to protect its investment in programs, e.g., distribution of programs on the basis of an agreement to keep confidential . . . Don't relate IBM's educational allowance, or changes in the allowance, to market conditions . . . Don't define 'normal support'; Avoid any indication of differing levels of support for different customers or different installations, even if the differences are unrelated to getting the order."

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Small Machines, Big Places — Part 2

Most Users Still Leery of Distributed Processing

By Esther Surden
CW Staff

WALTHAM, Mass. — Although a few pioneers are starting to use distributed processing techniques to shape their networks for optimum economic and managerial advantages, most users are very skeptical of distributed processing.

That conclusion was drawn by International Data Corp. (IDC), a market research firm here, after it surveyed 30 directors of management information systems (MIS). In a recently issued report on its findings, however, IDC cautioned that its sampling of MIS directors had a built-in bias because "much of the pressure pro and con [about distributed DP] is evolving from the non-DP management structures of these organizations."

Those users who are attempting to distribute their processing are introducing masses of "uninitiated employees" to computers and "often times bucking the natural bent of upper management to stay with IBM's prescribed data processing blueprint," the study noted.

Entitled "Minicomputers: The Impact on Large Organizations," the report said distributed processing will continue to develop over the next 10 or 15 years, although mass production operations will "remain appropriate" for many standard applications.

Transaction or event-driven applications will "drive the move toward distributed processing," the report forecast.

The report warned, however, that many users will find the complexities of computer/communications networks too "cumbersome" to attempt.

Tripartite Definition

After talking to the MIS directors, IDC came up with a three-pronged definition of distributed processing.

First, distributed processing involves a network of processing nodes, with each node dedicated to a specific organizational unit. Although the nodes are generally linked through communications hookups, IDC believes that "in some cases other forms of data transfer — media transfer, for example — are appropriate."

Secondly, a single data base is distributed throughout a distributed processing network and is stored, updated and accessed at specific nodes with minimal redundancy.

The third feature of distributed processing is some degree of central control, required to maintain "order and some logical flow" among the units.

Transportation and retail firms are spearheading the trend toward distributed processing, according to IDC. A railroad, for example, would use the concept to automate yard operations.

"As trains arrive at a yard, the host computer is notified and then assigns each car to a new block, based on the next destination in its route," the report explained. Local minis then pick up the operation, assigning tracks and keeping inventories of car locations as well as producing work assignments for the crew.

Retail chains are implementing distributed processing with their point-of-sale systems, allowing local store systems to track sales audit, inventory and merchandise control data and to provide buyers and managers with the information they need.

Those industries that are presently using distributed processing techniques justify the use for economic reasons. "Communications costs ... can be minimized by installing processor power at end-user sites," the survey showed. In addition, people costs could be reduced, the report added.

"The real driving force for this trend will be managerial accountability," IDC said, noting "hard justifications" in many cases "have followed rather than preceded the actual decision to pursue the distributed processing route."

When justifying distributed nets, "users have become more sophisticated," the report continued. Those surveyed normally analyzed the cost of at least two different approaches to the same problem — expanding the central site to accommodate a terminal-oriented application and distributing the processing.

"Such analysis took the form of cost per transaction, return on investment and many more," IDC said.

Four ingredients commonly made a company a likely user of distributed techniques, IDC found. First, the firm had a new application requirement of an operational, not administrative nature.

Secondly, the present DP organization was operating at near capacity so that implementation of this application would require expansion at the central site.

Further, the application usually posed a situation in which about 80% of the processing and data base requirements were self-contained at a local site, generally the source of that application's data.

Lastly, a pioneering, risk-oriented individual usually pushed for the concept and oversaw its implementation. That same person sometimes bucked a difficult political situation, with management against the approach.

An Inevitability

WALTHAM, Mass. — Distributed processing is inevitable.

That's what International Data Corp., a market research organization here, predicted in a study called "Minicomputers: The Impact on Large Organizations."

"Users are smarter than they used to be," the report said. "They have become more analytical in their approach to data processing costs. And one by one they will begin to follow the role of distributed processing."

There are several reasons for this, according to IDC. First, distributed processing takes DP out of the category of overhead items and allows management to appropriately allocate costs to various departments.

Secondly, traditional DP applications have been administrative in nature, but new applications will "impact the very heart of business applications." Distributing the processing allows remote locations to operate even if one system is down.

In addition, most applications, when weighted against alternatives, will prove more economical in the distributed mode. "Communications costs tend to be lower and people savings can be significant," IDC said.

IBM will also give its blessing to the concept, the report forecast, enabling the "whole evolution to pick up steam."

Distributed processing will have the impact "of a second industrial revolution," IDC believes. With millions of people having first-hand contact with computers as tools for their everyday work, more ideas for using those tools will be generated.

"The result may well be a sigificant change in ways of doing business as well as in our very life styles," the study predicted.

'Waves' Ready Next Month

NEW YORK — *The Waves of Change*, a book that *Computerworld* finished excerpting last month [CW, Oct. 17], is expected to be off the presses and ready for shipment in December.

Authored by Charles P. Lecht, president of Advanced Computer Techniques Corp. (ACT), the book will be published by Rhode Island Lithograph, ACT's printing/publishing subsidiary.

The price per copy will be $39.75 including postage and handling. Preference will be given to prepaid orders, ACT noted.

Orders for the book can be placed through Carl Menkel at ACT, 437 Madison Ave., New York, N.Y. 10022.

Kao Awarded Medal For Fiber Optics Work

NEW YORK — Dr. Charles Kuen Kao, a staff scientist with the International Telephone and Telegraph Corp. (ITT), has been awarded the Franklin Institute's Stuart Ballentine Medal.

The gold medal, which is awarded for outstanding achievement in the fields of communications or reconnaissance that employs electromagnetic radiation, was given to Kao for his research in optical fiber transmissions.

Kao received both his B.S. and Ph.D. degrees in electrical engineering from the University of London. He was presented with the 1976 Morey Award for outstanding contributions to glass science and technology.

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Nolan Sees Most DP Managers Staying in DP

By Debra Loomis
Special to CW

LEXINGTON, Mass. — More DP managers are going to remain in data processing than continue to climb up the management ladder, according to Dr. Richard Nolan, chief executive officer of the DP Management Co. and former associate professor at the Harvard Business School.

"Good DP managers are in high demand by major companies," Nolan said in a recent interview here, "and many DP managers don't want to move out of data processing at all; they enjoy the continual technical challenge."

DP managers are typically locked in DP jobs by top management even if they want to change. Nolan believes that by the time a DP manager is ready and able to move into other areas, for the most part he is lacking in the skills necessary to join senior management.

Technical Background

"DP managers have a strong technical background, but most haven't gone through any sort of company training program in the areas of marketing or finance, for example" Nolan stated. He feels it is necessary for the manager who wants to move up through the ranks to find a mentor within the company who will work with him.

"Today, if a young person knows that he wants to obtain a data processing background and then move on, I would advise him to enroll in a good technical undergraduate program and then obtain the necessary management skills in an MBA program," Nolan recommended.

Nolan pointed out that certain companies are advancing DP managers, and some are going on to vice-presidencies. "John Deere, Celanese and Xerox are promoting data processing people from within," he noted. "Celanese and some of the larger insurance companies like Aetna and Massachusetts Mutual have former DP managers as vice-presidents. And United Airlines has a former DP manager as president of one of its subsidiaries."

High Turnover Rate

In a recent 12-month period, 25% to 35% of DP managers in more than 450 companies were replaced, according to a survey conducted by a major vendor of computer hardware and software in 1975. These rates compared with 10% to 15% turnover rates among other senior managers.

According to Nolan, the remedy for this manager's plight is a closer and more sympathetic collaboration between him and top management.

In a 1973 article in the *Harvard Business Review,* Nolan wrote that "top management mishandles this key individual in many ways: it fails to recognize the fact that he needs to be at least as much a manager as a technician; it usually regards his job as a dead-end from which no promotion is possible, it tends to use him as a scapegoat when things go awry.

"On the other hand," he continued, "the DP manager is too often unaware that the computer applications he develops create waves that disrupt the old operating patterns of the organization.

Agent of Change

"He should be conscious that he is an agent of change — he should make sure that his department's innovations are designed to mesh with company operations as smoothly as possible and he must also make strong efforts, as a manager, to damp down whatever disturbing reverberations are unavoidable."

These problems still exist, he indicated. To function effectively, the DP manager must have a good understanding of his company, its capacity for change and its competitive environment, Nolan said.

To some extent, he believes, the magnitude of this job is being recognized. A number of companies with sophisticated DP activities have created a vice-presidency for the DP manager; others, with a lower level of activity, have the DP manager report to an executive vice-president or a service-oriented vice-president.

"By failing to provide the DP chief with a managerial career path," Nolan said in the same article, "top management is freely squandering its very scarce resource of managerial talent."

It is Nolan's belief that top management has a responsibility to treat the DP manager as a permanent, bona fide member of the management group, to evaluate his performance properly and to provide him with a career path.

Deadline Approaching For IIA Auditing Test

ALTAMONTE, Fla. — Jan. 31 is the deadline for registering for the annual certified internal auditor examination offered by the Institute of Internal Auditors, Inc. (IIA).

This will be the last opportunity for candidates without a baccalaureate degree or its equivalent to register for the exam, which is scheduled for May 18 and 19, an IIA spokesman said.

"By registering for the May exam and taking at least two parts this year, candidates without degrees will have five years to successfully complete the four-part exam," the spokesman noted.

Additional information about registration is available from the Certification Department IIA, 249 Maitland Ave., Altamonte Springs, Fla. 32701.

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EPA System Aimed at Preventing Oil Spills

By Tim Scannell
CW Staff

WASHINGTON, D.C. — The Environmental Protection Agency (EPA) is using a large mainframe with a commercially produced, generalized data base management system (DBMS) to help prevent oil spills.

Information about such spills that is generated through analysis of file contents helps the EPA develop and dictate regulations that make oil handling less harmful to the environment.

The System 2000 DBMS from MRI Systems Corp., running on an IBM 370/168, maintains a file on both onshore and offshore facilities (within three miles) that are under the responsibility of the EPA. Included in the file are facilities that drill, produce, gather, store, process, refine, transfer, distribute or consume oil. This includes more than 15,000 inspections and 6,000 oil spill reports for a population of more than 100,000 facilities, the EPA said.

The file details the safeguards, hazards and general condition of each site. If a spill does occur, that information, including cause, location, amount, type of oil and area of the spill, is also added to the file. It is on the basis of a file's content that the EPA dictates its preventative measures.

The EPA records the causes of oil spills such as this in its information management system in an attempt to prevent future accidents.

A Spill Prevention, Control and Countermeasure (SPCC) plan is required to be implemented at any non-transportation-related facility that could reasonably be expected to spill oil into the waters of the U.S. This plan is prepared by the owner or operator and must be certified by a registered professional engineer. The EPA conducts surprise inspections of facilities to determine if these plans have been prepared, certified and implemented. This information is also stored in the System 2000 data bank.

Since the System 2000 has been implemented, there has been a significant drop in the number of spills, the EPA said. In the area that includes Colorado, Montana, North Dakota, South Dakota and Wyoming, for example, there was a 58% reduction — from approximately 60,000 gallons to 30,000 gallons — in the number of non-transportation-related spills.

The EPA maintains personnel in 10 regional offices who travel to major spill sites, supervise clean-up operations and gather information to be batched and processed through the computer. Not only does this information help the EPA determine better methods of preventing spills, but it has also aided the agency in defending its own regulations in the courts.

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Potential Abuse Seen Alarming

By Esther Surden
CW Staff

SEATTLE — Universities are producing great numbers of well-educated potential computer abusers, David Brandin, director of the information science library at SRI International, said at a conference here recently.

An "alarming growth" is taking place in the number of people who have the skills to abuse computers.

"The universities and professional societies don't help the situation. They compound our problems," Brandin said. Students are taught computer skills but not ethics and law. Further, the professional societies do not even have enforceable codes of ethics, he added.

In the university setting, it is not unusual for students to play pranks with the system or steal computer time to run off a Snoopy calendar or play games. These activities "encourage more serious crimes," he contended.

It will take years before the country can "cope with the problem of growing abuse," he continued. To do so will require a "massive change of market consciousness" — a change that will have to start at the university level and with pressure from professional associations, Brandin said.

Presently, the Association for Computing Machinery (ACM), is looking at a proposed enforcement policy for a code of ethics, he continued.

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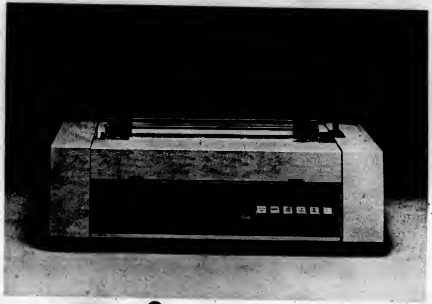

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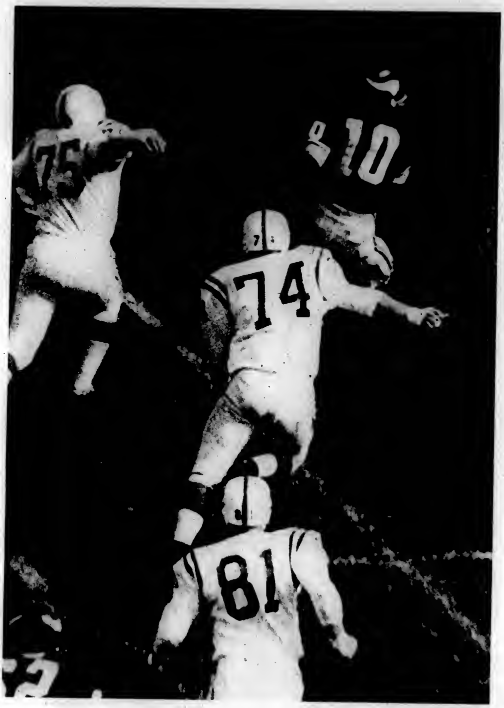

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Distributed DP Viewed Concept, Not Product

By Molly Upton
CW Staff

NEW YORK — "Distributed data processing is a concept, not a product," Jean-Michel Gabet, staff associate at Gnostic Concepts, Inc., said in chairing a session on using minis to replace mainframes at a recent conference here.

Perhaps one reason the term "distributed DP" (DDP) has so many definitions is that users are designing DP structures to suit their various corporate needs — an approach recommended by two speakers, Art Conover, vice-president of systems planning and programs for Honeywell Information Systems, Inc., and Jon Gould, vice-president of securities processing systems development for Citibank N.A.

Regardless of whether the DP structure is going to be distributed, the user should set it up to suit his needs rather than accept any specific plan of a vendor, they indicated.

Gould, who described systems with no data bases, said the need for data bases arises from the DP department's ignorance of what information management is going to want. Consequently, the DP department keeps track of everything, he said.

An advocate of distributed data bases, Conover pointed out that generally 90% of a firm's transactions involve only 10% of the data base. Response time problems stem not from CPU performance, but from access to the data base, he said.

Although Conover and Gould come from mainframe and mini backgrounds respectively, they agreed the decreasing price of technology facilitates the acquisition of more DP gear in order to implement efficiency within an organization.

Keys to Technology

In describing the various types of distributed data processing architectures, Conover emphasized that user requirements and changes in technology are the keys to future architecture.

Vendors have responsibilities to work with the users in designing the systems and should provide a broad range of flexible architectures that will facilitate protection of investment, he said.

They should also offer tools and utilities that make the system easy to use, he added.

In addition, vendors must make systems so reliable that the user thinks of them as he does a utility, such as a light switching on.

At Citibank, Gould turned to minis and micros to solve a problem that didn't stem inherently from the DP department.

Citibank has decentralized its corporate banking services processing as a means of offering good service while keeping the corporate budget flat and rendering the bank's costs insensitive to growth in volume of transactions, he said.

The bank's labor costs were $115 million, up 18%; other costs were $115 million, up 15%; and DP was $10 million, up 13%.

Since 1969, the Citibank staff has been reduced from 10,500 to less than 4,000 today, he said. The operating budget has remained flat, costs have gone down and the difference has financed depreciation of all DP gear and software development, he said.

However, Gould said the decentralized mini approach could not claim all the credit for the flat budget and the reduction in staff. The bank initiated an extensive "industrial engineering" type of examination of people's productivity within the bank at about the same time the decision was made to substitute capital equipment for labor, he explained.

As an indication of overhead, Gould said the bank had staffs for both the DP and user departments who served to "fire hand grenades at each others' walls."

If the bank had not taken the industrial engineering approach or instituted decentralized minis, its current operating costs would be about $400 million, Gould estimated.

Gould, an ardent fan of minicomputers and former employee for Interdata Corp., said one has to change his mental set and think of a mini as a telephone, an item that does not have to be kept busy to justify its expense, rather than a factory, which does.

Currently users tend to balk at using a mini because their criteria include such considerations as the largest single job to be run, regardless of its frequency, and the number of transactions per unit of time, Gould said.

Another means of determining what size system is needed is to give a project to two people for estimates of time and size, Gould recommended. One person should be oriented toward large machines and the other toward tiny machines. The differences will be astounding and the "success ratio will go up exponentially."

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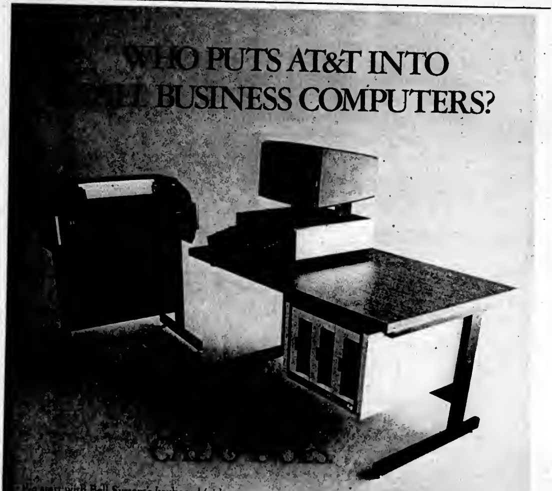

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Seen Compounding Problems

DDP Users Warned on Remote Development

By Molly Upton
CW Staff

NEW YORK — Users who move from a central DP operation to a distributed system with a distributed data base and then attempt to do development work at remote sites will only compound the difficulties they may already have in controlling their DP operations, according to Gene Altschuler, principal of Peat Marwick, Mitchell & Co.

Speaking at a recent conference here, Altschuler said users must deal with their organizational structure in parallel with technical developments rather than overlaying an inappropriate technical structure on their companies.

Mel Blitz, vice-president of advanced technology for Corporate Technical Planning, Inc. indicated people and organizations — not technical issues will be the dominant problems that users will face in data management.

In many cases users have had little success in effectively integrating a data base administrator (DBA) into the organization, he indicated.

However, Frederick H. Miller, assistant vice-president for The Equitable Life Assurance Society, described how his firm minimized such problems by carefully structuring interaction of the various DP components.

The problems associated with distributed development involve control, advice and monitoring, Altschuler said. In many instances, the person responsible for systems development in the remote sites is isolated from the central environment and operates in a user-driven environment.

The person feels that his fate will be determined by the user-manager, often a plant manager with day-to-day concerns.

In order to remedy the DPer's isolation from his peer group, a company should try to facilitate meetings so he can have a better sense of what is happening in DP throughout the corporation, Altschuler said.

Another problem is that of training, education and replacement for the DBA. Ideally there shold be a capable backup to the DBA at the same site, but usually if the standby is good, he leaves, he said.

A problem to which Altschuler also had no answer is that of control so synchronization can be achieved.

Despite the problems, the economic viability of DDP is convincing and the trend toward distributed DP should accelerate dramatically, Altschuler indicated.

Decentralized Development

Miller, who is manager of the data assurance division at Equitable, said his corporation has central processing and decentralized development.

The Equitable organizational approach has several names, including collateral management, matrix organization and staff guidance. With this structure, there are interfaces at various levels and across company lines, such as user groups for various data bases, Miller explained.

Equitable's commitment and dependency on DP is sizable. The DP budget is 12.5% of the firm's expenses, and 60% of this goes for development and 40% for operations.

The DP budget for 1977 was $51.5 million. There are over 500 on the staff for operations, 425 for development and 110 performing technical support.

The firm has three IBM 370/168s and over 300 minis, along with 4.5 billion bytes of disk and 28,000 active tape reels.

Separate Development

Of the five major operating areas within the firm, each has its own systems development staff except the corporate sector. The size of these staffs ranges from six people to over 400, Miller noted.

Under corporate computer services, the data and systems assurance group handles data administration, quality assurance and DP standards.

The data administration's responsibilities include both policies and functionality of the system, he said. It ensures that policies regarding data are in line with corporate objectives and needs and that the overall system can be efficiently used.

Furthermore, it concerns itself with data protection, data base environment and application opportunities. The group sets policy on privacy matters, works with internal auditors and keeps abreast of privacy legislation, Miller said.

It also attempts to relate future technology to future needs and to influence vendors to provide what Equitable needs. In addition, it investigates what features end users might like from the data bases and provides a liaison with users and systems planning groups, he added.

The group interfaces with the data base coordination group, which is the front-line troop for authority to access, housekeeping and control for the IMS data base, he stated.

The data base design group assists developers and reviews all changes.

Another control point is the data dictionary support group, he indicated.

The principal interaction of the data base administration group with the systems development areas is through the DP policy committee, which is chaired by the senior DP person, his representatives and the heads of systems development areas, Miller said.

The policy committee reviews user requests to ensure they are consistent with institutional plans and also facilitates DP staff reassignments. This latter function helps prevent the loss of expertise from the company, he indicated.

Data base user groups transcend various lines in the corporation and involve both the systems developers and user organizations. Sometimes this can be difficult if the system developers aren't on good terms with the users, but generally things have worked well, Miller said.

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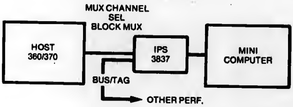

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Lecht: Dispersing DP Means Distributing Incompetence

By E. Drake Lundell Jr.
CW Staff

MUNICH — "Incompetence contained in the data center is better than distributing it throughout the organization," an American consultant and author told the recent Systems 77 conference here.

Charles P. Lecht, president of Advanced Computer Techniques, Inc., said one of the greatest problems with distributed DP (DDP) is the fact that a typical organization does not have enough people to do the programming and run the dispersed systems.

Because of the people and organizational problems it causes, Lecht predicted DDP "will fade" as a concept and warned users to go slowly in implementing dispersed systems. Three reasons are often given for moving to distributed processing, according to Lecht:

- Centralized DP has failed.
- Distributed processing is cost-effective.
- Users want to change or just try something new.

But, he indicated, the waves of change in the compter industry are changing most of the old equations.

For example, main memory in large quantities is now becoming available at low prices, a factor that he said will argue for recentralization. Falling prices for large systems and more effective programming techniques could also make central DP more effective, he hinted.

At he same time, Lecht said, it has not been proven that DDP is more cost-effective. In fact, he indicated, with the additional manpower needed to program and operate the distributed centers, the distributed concept could be more expensive — even if the people were available.

Finally, he indicated that IBM is resisting DDP and this could hold back the field. Lecht described the IBM positon by asking, "If God had wanted distributed processing, why didn't he put a brain in the wrist?"

Jain Gains Honor

BUFFALO, N.Y. — Dr. Anil K. Jain, an associate professor of electrical engineering at the University of New York at Buffalo, was recently given an award for his development of computer picture-coding techniques.

Sponsored by the National Science Foundation to present a paper at the International Picture Coding Symposium in Tokyo, Japan, Jain and his associate, Sheng H. Wang, a student, were awarded two first prizes.

Jain's transmission method, termed Adaptive Hybrid Coding, allows pictures to be transmitted by coding the information so each bit of data transmitted contains as much information as possible.

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Disinterest Seen Snag in Professionalism Quest

By Catherine Arnst
CW Staff

WASHINGTON, D.C. — Gaining professional status for data processing personnel is difficult enough without being compounded by the fact that so few people are interested in the problem.

This view was expressed at a Data Processing Management Association (DPMA) Info/-Expo '77 session here recently attended by only 20 people.

John Salasin, a group leader with Mitre Corp., observed that there are two aspects to professionalism: competency and responsibility.

Individual responsibility is inhibited by six factors — the values of the organization for which one works; the resistances of the individual borne out of the fear of losing his job; lack of information; lack of resources; obligations; and the benefits gained by acting irresponsibly, he said.

To foster responsibility, Salasin suggested that one person in an organization be identified as the person ultimately responsible for a project. That person should take affirmative action in learning the rules, specifying the penalties if those rules are broke, taking adequate security precautions and maintaining accurate and timely data.

Donn Parker, a senior management consultant with SRI International, took a different view.

Parker, who is currently involved in laying the foundation for a professional code of ethics, switched the emphasis from methods an organization could use to ensure professionalism to the behavior of the individual.

Before any kind of code can be written, "unethical conduct" must first be defined. "Almost every keynote speaker mentions professional conduct, but that is putting the cart before the horse," Parker said.

The consultant developed a series of scenarios portraying different types of behavior for presentation last year to a workshop whose participants judged ethical and unethical behavior. The results of that workshop will be published by the American Federation of Information Processing Societies this year, he indicated.

Parker presented three of those scenarios at the session here and got very similar results, he said.

The first scenario described a programmer who developed a program of great value to his employer, then quit and went to work for a competitor. He gave a copy of the program to his new employer, who used it.

Seventeen session attendees found the programmer's behavior unethical, three thought it was not unethical and two saw no ethical issue involved.

At the National Computer Conference last June, Parker presented the same scenario; 130 thought it unethical, 61 not unethical and 13 said no ethical issue.

The large number of voters for the second option could be attributed to the probability that there were more programmers at the NCC session than there would be at a DPMA conference, Parker said.

Alan Taylor, consultant and contributing editor to *Computerworld* changed the scenario by adding that what the programmer was doing was clearly illegal. With that qualification, nearly everyone voted that the behavior would be unethical.

"The fact is that we already have ethics . . . we do not perform illegal acts or condone them," Taylor said.

The illegality of certain acts already forms a constraint on behavior, but not even that standard has been universally recognized by the industry, he said.

"Rather than trying to find the ultimate code of ethics, we can take the simple one, but no one has taken even this simple step," he complained.

'There is no decent road map or even a sense of urgency" from within the industry to establish a code of ethics — all the pressure comes from outside. It is not being done because of apathy, he said, pointing to the sparse attendance at the session to illustrate his point.

Joan Shields, director of systems support for the Air Force data center, brought the emphasis back to what actions could be taken by an organization to ensure the professionalism of its employees.

There must be a "commitment to excellence" by the organization, Shields said.

"The organization must encourage the individual through constant learning" such as training sessions and literature, she said. Management is responsible for the development of professionalism in any organization and individual commitment matters little if management isn't also committed, she added.

Calendar

Nov. 15-17, Tokyo — Semicon/Japan. Contact: Semicon, Suite 212, 625 Ellis St., Mountain View, Calif. 94043.

Nov. 30-Dec. 2, Newport Beach, Calif. — **1977 Chief Executives Conference: Positioning Your Company for The Future,** sponsored by the International Business Forms Industries, (IBFI). Contact: IBFI; 1730 N. Lynn St., Arlington, Va. 22209.

Dec. 1, Palo Alto, Calif. — **California Computer Show.** Contact: Norm De Nardi Enterprises, 95 Main St., Los Altos, Calif. 94022.

Dec. 5-7, Washington, D.C. — **Computer Contract Negotiation.** Contact: Ruth Dargis, ACT-Brandon Co., 437 Madison Ave., New York, N.Y. 10022.

Dec. 6, New York — **The Impact of Personal Computing on Traditional DP, Communications and New Markets.** Contact: Carolyn Mathews, Yankee Group, P.O. Box 43, Harvard Sq., Cambridge, Mass. 02138. The same seminar will be held Dec. 9 in Anaheim, Calif.

Dec. 6-7, Washington, D.C. — **Workshop on Reducing Software Complexity,** sponsored by Infosci. Contact: Infosci, Inc., Box 7117, Menlo Park, Calif. 94025.

Dec. 7-9, Las Vegas — **Data Processing Security: The Total Corporate Approach,** sponsored by Data Processing Security, Inc. Contact: Jon Allen, Program Director, 235 N.E. Loop 820, Hurst, Texas 76053.

Dec. 7-15, Moscow — Sovexpo 77. Contact: Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017.

Dec. 12-14, Chicago — **Management Information Seminar on Minicomputers,** sponsored by the University of Chicago Center for Continuing Education. Contact: Heidi E. Kaplan, Department 14 NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

Dec. 12-14, Los Angeles — **Seminar on Data Processing Operations Management,** sponsored by the University of Chicago Center for Continuing Education. Contact: Heidi E. Kaplan, Department 14 NR, New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

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Call for Papers

EIGHTH INTERNATIONAL SYMPOSIUM ON FAULT — TOLERANT COMPUTING. Toulouse, France, June 21-23, 1978.

The emphasis of the conference will be on the system approach and on the interaction between technological advances and fault tolerance. Suggested topics include hardware and software architecture of fault-tolerant systems, testing for quality production and error recovery and system reconfiguration.

Summaries of 200 words are due as soon as possible and 4,000-word paper propositions are due before Dec 1. They should be in English and sent to M. Diaz, FTCS-8 Program Committee Secretary, L A A S., 7, Ave du Colonel-Roche, 31400 Toulouse, France.

EIGHTH ANNUAL SYMPOSIUM ON AUTOMATIC IMAGERY PATTERN RECOGNITION, Gaithersburg, Md., April 3-4, 1978.

Emphasis will be on the application of image pattern recognition techniques to new industrial and commercial uses, in addition to military applications. In special demand are papers that bridge the gap between technical developments in image pattern recognition and industrial and commercial needs.

Suggested topics include segmentation and scene analysis, change detection and matching and transforms and filters. Suggested new areas of application include pulp and paper manufacturing, measurement instruments, agriculture, biomedical analysis and forensic sciences.

Extended abstracts should be sent by Nov 15 to Leslie Santacroce, Electronic Industries Association, 2001 Eye St. N.W., Washington D.C. 20006.

FOURTH INTERNATIONAL CONFERENCE ON DIGITAL SATELLITE COMMUNICATIONS, Montreal, Canada, Oct. 23-25, 1978.

The conference will address all aspects of digital communications via satellite for the provision of international, domestic and specialized services, their relationship to terrestrial systems; and new developments in digital technology and techniques for voice, image and data processing.

Suggested topics include spectrum and orbit utilization, integration of ground and space segments, echo control techniques, RF equipment in ground and space segments and economic analysis of new applications and services.

Four copies of a 1,000-word summary for a proposed paper should be sent by Dec. 1 to Manager of Administrative Office, The Fourth International Conference on Digital Satellite Communications, Teleglobe Canada, 680 Sherbrooke Street West, Montreal, Canada H3A 2S4.

FIFTH ANNUAL CONFERENCE ON COMPUTER GRAPHICS & INTERACTIVE TECHNIQUES, Atlanta, Ga., August 23-25, 1978.

Papers are requested dealing with any innovative approach to graphics. A 500 word abstract should be sent by Dec 2 to Prof. R.L. Phillips, 213 Arrowspace Engineering Building, University of Michigan, Ann Arbor, Mich. 48109.

15th DESIGN AUTOMATION CONFERENCE, Caesars Palace, Las Vegas, Nev., June 19-21, 1978.

The conference will emphasize the use of computers as aids in the design process.

Areas of interest include design verification, simulation, layout, documentation and software engineering. Application areas of interest include DP design in an LSI environment as well as other design areas, such as architecture, ship building, aerospace vehicles and software designs.

Three copies of a preliminary paper should be sent by Dec. 8 to Robert J. Smith II, Lawrence Livermore Laboratory, P.O. Box 808, L-156, Livermore, Calif 94550.

SOUTHEAST ASIA REGIONAL COMPUTER CONFERENCE, Manila, Philippines, Sept. 4-8, 1978.

The conference will be primarily aimed at enhancing international sharing of computer technology and regional exchanges of applications for national development. Suggested specific topics include progress in electronic technology, advanced programming techniques, national policies on the application of computers for development, computer selection and evaluation and computers in natural resources development, in national health programs, in human settlement and in engineering.

Four copies of a manuscript no longer than 2,500 words, accompanied by a 100-word abstract, should be sent by Dec 20 to Dr. P.F. Baradoidan, c/o Philippine Computer Society, MCC P.O. Box 950, Makati, Metro Manila, Philippines.

1978 SUMMER COMPUTER SIMULATION CONFERENCE, Newport Beach, Calif., July 24-26, 1978.

The theme will be "Simulation Today." Suggested areas for papers include digital and hybrid simulation systems and application areas such as energy conservation and utilization, aerospace, chemistry and the emerging simulation languages.

Two-to four-page summaries should be sent by Jan 1 to Dr. Ralph C. Huntsinger, 1978 SCSC Program Chairman, Computer Science Department, California State University-Chico, Chico, Calif. 95929.

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With Minimum Disruption of Flow

Australians Favor International Privacy Accord

By G. Russell Pipe
Special to CW

SYDNEY, Australia — An international agreement specifying privacy protection guidelines and at the same time minimizing disruption to transborder data flow is favored by the Australian Law Reform Commission and the DP Division of the Australian Public Service Board.

"There are to be significant increases in the scope of government transborder data applications," according to P. Morgan, head of the DP division, "which raise privacy and security considerations." At the present time, the amounts of data transmitted or received from overseas are not significant, he stated recently. "Actually, there is much more data flowing in and out of the country on magnetic tape media than via telecommunications."

This includes an interchange of data on world trade statistics supplied to and received from the United Nations, the General Agreement on Tariffs and Trade (Gatt), the European Community and data relating to international patents, meteorology and cartology.

Government departments transfer outside Australia data relating to defense inventory and supply systems such as computer-based retrieval of medical abstracts.

In the future, Moran indicated, a network utilizing Department of Foreign Affairs switching centers in Canberra, London and Washington will be employed for immigration, treasury, trade and customs functions.

As the data being transmitted increases in value, government departments will become more dependent on the smooth passage of data for satisfactory administration in overseas areas, Moran stressed. The present national networks facilitate a greater exchange of data domestically for customs, health insurance, pharmaceutical benefits, pensions, education, taxation and statistical programs and could have an impact on flow abroad, he added.

Government Guidelines

The practice of utilizing overseas-based time-sharing systems is increasing in Australia, largely for reasons of economy. The advantages of foreign services in comparison with locally available facilities, Moran cautioned, should be carefully evaluated in choosing such bureaus.

Guidelines were issued to government departments in 1975 calling attention to the need for high security standards and to "potential problems which could arise in extreme circumstances." This might arise from disputes or conflict of interest between users and bureau management, "possibly leading to withholding of the user's data or denial of access to facilities.

"Such situations might be complicated by the difficulties posed by recourse to law in the overseas country and subsequent embarrassment to the Australian government," the guidelines said.

"Satisfactory continuity of service and the adequate protection of data in all circumstances are far more difficult to obtain under these conditions," they continued.

The guidelines also express a concern that by using overseas service bureaus, government departments could be affected by the financial stability of the services, industrial unrest, political decisions or national emergencies in the overseas country, "all of which are largely beyond the control of the remote user."

The Australian Law Reform Commission was charged in 1976 by the Commonwealth Attorney General to investigate and report on the legal protection of privacy in the private and public sectors. "This is the first attempt in Australia to approach protection of privacy in a comprehensive way," G.E. Brower, secretary of the commission, said.

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(Continued on Page 22)

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Political, Economic Impact

Information Discrimination Seen Effect of Technology

By Kathleen Quinn
Special to CW

ATLANTA — "Information discrimination" and "cross-subsidies" are two side effects of the electronics age that have some serious social and political implications for all levels of society.

We now have individuals, organizations and nations that are either "information-rich" or "information-poor," according to Ronald S. Eward, president of MarTech Strategies, Inc., who spoke at a recent conference here.

As an example of the information-rich, Eward cited the 10 R&D firms that worked on the National Aeronautics and Space Administration's (Nasa) space program. That project led to development of semiconductor technology, which these firms have marketed exclusively and very successfully.

The value of that information cross-subsidy was enormous, according to Daniel O'Neil, assistant director of the Office of Telecommunications Policy (OTP). Since no one has yet defined a standard for the value of information, this "government subsidy" cannot be calculated.

Another problem inherent in the "information society" is the potential for the information-rich to control and repress those with less information.

The politics of information are inseparable from the economics of information, according to Eward. Therefore, since large cross-subsidies such as the one given to the R&D outfits by Nasa are bound to lead to a greater concentration of wealth and power, control and repression of the society by the "information-rich" can result. "And the probability of a favorable outcome is no better than that of an undesirable outcome," Eward added.

Boundaries Blurring

"A third impact of the electronic age will be the blurring of institutional boundaries," Eward said. The computer/communications area is an example of two previously distinct markets that are no longer easily separated.

Electronic banking, retailing, journalism, securities, credit, etc. will pose similar problems in defining their market boundaries.

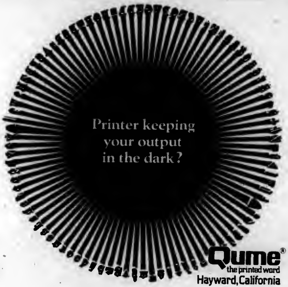
Although these warnings appear bleak, Eward also predicted that the thrust of electronic technology will be a major human-rights concern during the next 20 years, as public awareness of the technology and information transfer explosion grows.

"The need for a national information policy is great," according to Eward, who has just completed two years of work on an OTP study, "The Information Society in an Electronic Age."

Whether this policy will be simply a restructuring and synthesis of policies presently in effect at the several information commissions or whether it will be something "fundamentally different" is as yet undecided. This decision must be made by the new Assistant Secretary of Commerce for Communications and Information, a post recently announced by President Carter, Eward added.

The fact that creation of this new post will give the U.S. Department of Commerce control over the national policy is preferable to trying to decide on a policy in the midst of the "three-ring circus" that existed previously, according to O'Neil.

However, there is some doubt about the neutrality of the government as developer and administrator of this policy, O'Neil said. The government's expenditure on information services for scientific and technical purposes alone was $2.8 billion last year. The total value of information services rendered to the U.S. is probably incalcuable, O'Neil added.



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Newkirk Calls Motivation Real Job of DP Managers

By a CW Staff Writer

NEW YORK — A manager is someone who gets things done through others, according to Nate Newkirk, president of NGP Associates, Inc., a one-man consulting firm.

Managers have four functions: planning, controlling, organizing and directing, he said.

The manager must motivate — or take action that causes an action, either positive or negative, Newkirk explained.

Motivational theory says that all people have needs which never cease and that some needs are more significant than others, Newkirk explained. A satisfied need doesn't motivate the person any longer, he added.

Survival is the most basic need and once that is satisfied, security or planning for the future becomes important, according to Newkirk.

Next justice or relative position compared with the next man becomes important; when that need is satisfied, then status in the organization must be fulfilled, he said.

The last and most difficult need to satisfy is giving meaning to the individual's work, he said.

The people in a DP shop have needs at various levels, but most are concerned with the last since everyone wants work that teaches them something, Newkirk said.

Money as Motivator

Money can be utilized as a motivator in some cases, but the job itself is the best method of motivating employees, Newkirk said.

If an employee is unhappy with his salary, he can ask for a raise, quit or withhold work to equalize the situation, Newkirk explained.

Motivating through work is difficult for a manager since there are limited opportunities to distribute to each employee, he said. The opportunities should be given to those people who are good workers, but are presently dissatisfied with their jobs; those are the people a manager wants to keep but might be in danger of losing, he pointed out.

Training is sometimes used as a motivating factor, but it is not a very good one in Newkirk's opinion. If employees are given a skill they can't use in their job, they'll go somewhere where they can use it, he explained.

Training is only a motivator if a worker benefits by it in his job; the skills gained should be used immediately after they are learned, he said.

In the end, it's the little things that make workers happy, and an understanding relationship is one of the fundamentals, Newkirk said.

Newkirk outlined some basic measurement concepts including defining and establishing a goal. Since most goals are too big to be manageable, interim goals must be set up.

If a goal is not met, the employee or team should be punished in some way, he said.

A frequent problem encountered by the manager is an imposed deadline, according to Newkirk. The tighter the deadline, the less planning occurs — when in fact the opposite should happen, he said.

A manager should plan for contingency problems by trying to realize what they might be and work around them, Newkirk said. A good manager will learn to develop an early warning system about problems to avoid taking time out from his other functions to fix a problem with the system or the procedure, according to Newkirk.

The last major problem to deal with is the "prima donna" employee who considers adoration to be his due. The manager should strike a bargain by putting up with it, but only as long as it doesn't interfere with someone else's work and as long as the prima donna provides an excellent product, Newkirk said.

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Misconceptions Called Blocks to Privacy Laws

By Ann Dooley
CW Staff

NEW YORK — Congress will never gain enough public support to pass a law protecting individuals from information abuses by insurance companies until a number of common misconceptions are erased, according to Robert Ellis Smith, publisher of *The Privacy Journal.*

One common misconception is that privacy and security are the same thing, Smith said. This is not so and, in fact, most abuses come from authorized rather than unauthorized use of information, he told attendees of a recent conference here.

Another misconception is that insurance companies are protecting privacy by not disclosing medical data to the patient, Smith noted. Other people see that data, and the patient should also have the right to view this information, he contended.

Still another misconception is that privacy rules would be expensive. That is not the case because many would simply involve good security or proper management, he said.

Some also allege that those who complain about invasions of privacy are those who have something to hide, Smith said. That is untrue since many just want to be sure the compiled information is accurate, he explained.

As for the argument that business would be able to protect personal data better than government because it is more streamlined and efficient, that is also false, Smith claimed, because in the rush for profit, privacy protection would not be a business' first priority.

Another misconception is that the problem lies with someone else's information handling methods. The police blame the credit agencies who blame the FBI who blame insurance companies, Smith said.

But "we're all information collectors or information victims," he reminded his audience, noting more than 50% of the population is involved with information processing.

Voluntary Compliance

Speaking for the insurance industry, Edward Cabot, assistant general counsel and chairman of a privacy task force for the Equitable Life Assurance Society, said voluntary compliance is the best way for the insurance industry to protect privacy.

The Privacy Protection Study Commission's recent report should serve as a model on how information should be handled, Cabot said. The problems won't go away and will only be an impetus toward legislation, he cautioned.

However, he did warn that one recommendation made by the commission is dangerous because it "goes to the heart of the underwriting process." Changing the information requested on insurance forms would jeopardize the process since it is essential to know enough about an individual to classify him in the proper risk category; otherwise, other policyholders might have to take up the slack, he said.

Balance Applauded

The commission's attempt at balance between the government and the individual should be applauded, according to Russel Press Jr. of Travelers Insurance Co. Press said he likes the idea of having specific recommendations for specific businesses rather than a shotgun approach to privacy.

All segments of the insurance industry, however, are treated the same, although each is quite different, he added.

People should have the right to complain about the relevance and propriety of information use, but government won't leave it at voluntary compliance and the underwriting ability could be hampered, Press said.

Since many people don't take advantage of the right to view their records when they can, any law should require that information be disclosed only at the request of an individual — an approach that would also prove less costly, he said.

Ron Plesser, former general counsel of the Privacy Protection Study Commission, explained how the commission came to recommend the changes in information handling it published in its final report last July.

The commission tried to put the individual back in the middle so he could find out what's going on and fend for himself, Plesser said, noting the government would be used only as backup.

Insurance authorization forms often ask for information that doesn't relate to insurance, he added, recalling that one witness before the privacy commission described them as "open search warrants."

Individuals should have the legal right to access their insurance forms and the right to correct or delete faulty data, Plesser stated.

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For On-Line Applications

Novice Users 'Program' Via Questionnaires

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. — How do you encourage users with little or no formal computer training to take a more active role in programming their on-line applications?

One method involves the use of questionnaires, according to Donald Devine, president of Comshare's Human Resource Management Division in Philadelphia.

Devine recently described the technique and its potential benefits at a conference here in a technical session entitled "Getting the Non-DP-Oriented User to Program by Questionnaire."

As Devine explained in his presentation, the procedure begins when a time-sharing firm like Comshare sends a user a standard questionnaire requesting key information about an application the client wants performed. From the data the user provides in the questionnaire, the time-sharing firm generates two documents — a statement of the application's main features and an "input preparation list" (IPL), which shows in schematic form the data needed to perform the job.

The user then completes this customized schematic and returns it to its source. The result is an automatic, distributed program that is customized to the user's application, Devine said.

The purpose of this form of programming is not to turn nontechnical users into programmers or to force them to learn a full-fledged programming language. Rather, it aims to take advantage of users' intimate knowledge of their applications and to make them accountable for the applications' success or failure, Devine explained.

In the past, users were encouraged not to get involved in their systems programming but to rely on DP professionals to understand and meet their applications needs. As a result, many on-line jobs failed for lack of knowledge about user problems.

Devine illustrated the programming-by-questionnaire concept with the example of a profit-sharing plan accounting program his firm wrote for a bank's trust department.

This application, he said, imposed four constraints on the program: it had to be easy to learn, mostly error-proof, timely and economical.

To write the program, Devine's company first developed a general approach to solving the client bank's applications problem. This approach involved writing a data base management program and placing it in a data base management system, he recalled.

Next, the firm wrote a second program to decide what data would be needed to construct a satisfactory profit-sharing plan and then translated this data into data base management system language, Devine said.

Finally, the company developed a questionnaire for specifying the parameters of the bank's profit-sharing plan. The questionnaire was self-explanatory to anyone who was familiar with the language of the application, he added.

Since the institution of the program-by-questionnaire concept in February 1976, Devine and his colleagues have developed 130 profit-sharing plans serving 20 client banks and 3,900 employees.

The technique also works well with applications like treaty reinsurance processing and with standard accounting functions like payroll, general ledger and accounts receivable, Devine said.

Anderson, Bell Physicist, Awarded 1977 Nobel Prize

MURRAY HILL, N.J. — Dr. Philip W. Anderson has been awarded the 1977 Nobel Prize in Physics for his role in developing an improved understanding of localized magnetic moments.

Dr. Anderson, a consulting director in the Physical Research Division of Bell Telephone Laboratories and a professor at Princeton University, shares the award with John H. Van Vleck of Harvard University and Sir Nevill Mott of Cambridge University, England.

Localized magnetic moments, Dr. Anderson explained, are atomic-sized magnets that remain fixed at a particular site in a metal. His research resulted in a better understanding of why certain atoms such as iron are magnetic when dissolved in nonmagnetic host metals and why other atoms that might be expected to be magnetic are not.

Anderson has also made several other fundamental discoveries in magnetism. One of these relates to the reason why certain insulators containing transition metals such as gadolinium and europium are magnetic. One of these materials, called magnetic garnet, is the basis for magnetic bubble memories, which will play an important part in telephone equipment and computers.

Dr. Anderson will be the fifth Bell Labs scientist to be awarded the Nobel Prize in Physics. According to the Royal Swedish Academy of Sciences, he and his colleagues will be given the $145,000 prize on Dec. 10.

Australians Favor Accord

(Continued from Page 17)

data is regulated by statute, and a New South Wales privacy commission is now developing guidelines for the collection, storage and dissemination of data.

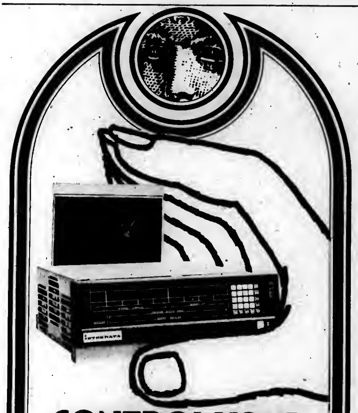
The general interest in privacy coincides with that of other countries, Brower stated, as well as with a number of developments to secure legislative protection of human rights that have been taking place in Australia recently.The 1975 Racial Discrimination Act, the forthcoming Freedom of Information bill, the government's intention to establish a Human Rights Commission and appointment of the Commonwealth's first Ombudsman in 1976 all point to privacy as a right to be legally recognized and protected.

In addition to these developments, the Law Reform Commission is concerned that "major trends in computing technology can be expected that could result in an increased availability of dispersed processing power serving wider sections of the community in entirely new fields."

Transborder data flows are being specifically studied by the commission. Based on its findings to date, it has concluded that international action is indeed necessary. "The handling overseas of information on Australian residents should be in accordance with procedures acceptable at the domestic level.

"Where this is followed there should be generally no impediment on the flow of such information, provided that its treatment and dissemination overseas are in accordance with the rules developed in the country of origin. The commission favors an international agreement on standards to be observed and to minimize disruption to transborder data flows.

"Care must be taken so an agreement will not be so vague as to be meaningless."



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Davis: DP Risks Worth Taking — With Care

By Catherine Arnst
CW Staff

WASHINGTON, D.C. — The risks inherent in using computers are somewhat analogous to the risks of using automobiles — cars kill about 50,000 people a year, but we use them anyway since the advantages far outweigh the risks.

The public perceives many risks arising from computer use including the rapid approach of "the Big Brother society" and the loss of freedom of action and individual privacy resulting from allegedly unregulated electronic surveillance and large computer data banks.

This comparison between computers and autos was made by Ruth Davis, Deputy Undersecretary of Defense for Research and Technology, before an audience at a recent conference here.

The public also attributes the loss of jobs to automation, the loss of students' arithmetic skills to the widespread use of electronic calculators and the increasing complexity of modern warfare to the use of computer weapon systems, she said.

Along with these generalities, Davis offered some specifics. One problem that already has a 25% probability of occurring is that enough plutonium could be obtained in one year to build a bomb because of the round off errors in the plutonium accountability system at a nuclear plant site, she said.

A more common, albeit mundane, problem is a 30% probability of error in the credit records of any individual possessing more than three credit cards, she said.

Science Fiction Scenario

Davis suggested what she called a "science fiction scenario" in which computer applications were banned in all 50 states during the same six-month period except for those in scientific laboratories involved in defense or nuclear activities. Any other proposed applications had to be approved by the state legislature and licensed and monitored by public advisory groups.

During the same period, Congress voted into law a ban against all computer applications where management was unable to guarantee zero risk.

As the consequences of these actions spread through the DP industry, five major efforts swung into action, Davis suggested. Managers had to assess alternative ways to perform functions now handled by computers, develop legally acceptable interpretations of "zero risk of damage," determine the national and international value of computers in terms of a country's ability to wage military and economic warfare, arrive at legal definitions of what is and is not a computer, and assess the effects of the ban on employment and the economy.

The first reaction to the ban was a relaxation of the public's feeling of computer threat.

Experts were incredulous and most agreed they could not run their operations without computers, Davis said, as she continued her scenario.

Since there were no means for judging the safety of computers, the ban resulted in a tremendous investment in the preparation of "computer impact" statements needed to prove zero risk damage, Davis suggested. It was determined that a computer system would be safe if its risks were judged to be acceptable. The weaknesses and deficiencies of computer systems and the problems of creating safeguards became immediately apparent, she said.

Within 30 days of the legislated computer ban, Congress passed a law superseding all states' laws banning computers which permitted computers in high-impact applications to resume operation for an interim period, Davis said in her story. These included large funds-disbursing systems, national security and defense systems, large individual information systems — such as law enforcement and patient record systems — and real-time systems used for public protection or for public services, such as the telephone, reservation and weather-predicting systems.

"Hopefully, such a scenario will remain science fiction, but its contemplation by managers would lead to an acceleration of our efforts to look at the risks of computer systems," Davis said.

"It may seem to many of us that computer professionals can do nothing right today in the eyes of the public, but I suspect the real truth is that they cannot make progress fast enough. Thus, I would conjecture that computer professionals have a real mandate to accelerate their efforts in making computers safe and in setting acceptable levels of risk," she concluded.

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Editorials

No Wonder . . .

. . . IBM has been trying to keep thousands of confidential documents out of the record in the U.S. vs. IBM antitrust suit — some are shockers (see story on Page 1).

The company has fought for years — through two appeals (one to the Supreme Court) and even the risk of a heavy fine — to keep thousands of internal documents out of the hands of the government.

The firm has been rebuffed at every turn and finally a few of the documents have been put in the public domain.

None are truly "smoking guns" that by themselves would prove the government's allegations of monopolization, but the first group indicates that IBM tried to "launder" its files in a manner that would make its position in the industry harder to detect.

People experienced at reading IBM documents released during various cases against the firm have often wondered why the documents seem to raise as many questions as they answered.

Now the picture is becoming clearer: IBM managers were instructed to remove certain documents from their files.

Perhaps those documents that may now be irretrievably lost contained many of the answers to the questions that have been raised by IBM's conduct in the business.

U.S. Out of Step on Privacy

In the past month or so, there has been a great deal written and said about the issue of transborder data flow and the need to protect personal data as it moves from one political jurisdiction to another.

Unfortunately, the U.S. appears to be out of step with the rest of the industrialized Western world on this issue.

Many of the countries in Western Europe have enacted statutes that protect the privacy of their citizens when personal information is stored in computerized information systems. Now, logically, they want to extend that protection of citizens' rights in cases where the data is stored in another country.

After all, it does little good to have laws protecting the confidentiality of information on a German citizen in Germany, if that same information can be accessed freely in the U.S., for example, by the multinational company that employs him.

In order to extend this protection, the Western European nations are trying to come up with an international agreement that would serve to keep information confidential no matter where it is stored.

The U.S., however, wants more time to study the issue, since it is one of the few countries that has no omnibus data privacy legislation on the books — and apparently has no desire for such legislation.

And while the Council of Europe only proposes to implement its data protection agreement in two years, the U.S. representatives of the information industry say there is a need for a longer study period.

But while the U.S. information collectors fight against wide-ranging and meaningful privacy legislation in this country, they also went to do business in countries that have such legislation — and do such business under the loose regulations that govern them here.

The information industry here has fought against any type of omnibus privacy legislation — and, because business speaks in Washington, it has been able to convince commissions and Congresses that there is no need for a universal law to protect privacy.

We disagree with that position and feel that an omnibus privacy law is necessary to clearly spell out the rights of the data subjects and the responsibilities of the data collectors.

If the U.S. information industry does not want to make the privacy and confidentiality of data a high priority — and there are no indications that it does — then it will just have to lose business in countries that care more about the rights of their citizens.

The U.S. industry has to learn that it can't have it both ways.

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Data Past

Five Years Ago
Nov. 8, 1972

WASHINGTON, D.C. — The National Bureau of Standards launched a six-month study to determine the significance and impact of Ascii as a federal DP standard.

Under the federal standard, all computers and related equipment brought into the federal inventory after mid-1969 were supposed to be compatible with Ascii.

It was hoped that such compatibility would facilitate the swapping of information and programs between DP centers.

Eight Years Ago
Nov. 12, 1969

DALLAS — A proposal for a nationwide common carrier communications network "custom-tailored for use by computer users" was getting final touches here for presentation to the Federal Communications Commission (FCC) by Detren Transmission Co. (Detren). The Detran proposal came three months after the FCC ruled that Microwave Communications, Inc. (MCI) could establish the first link in what MCI said would also be a nationwide communications network.

Letters to the Editor

Forewarned Is Forearmed

Anyone contemplating purchase of Univec hardware should be aware that a later sale to a new user may involve expensive replacement of components before Univec will provide a regular maintenance contract.

No matter that the hardware has always been under Univec's maintenance! If it thinks a component might fail in the next year, Univec requires you to pay extra for its replacement before it will give a maintenance contract to a new owner.

Further, this additional charge is unpredictable and can be high. Witness our sale of a whole system where replacements cost 25% of the system's selling price.

James K. Morrow
DP Manager

S.M. Hymen Co.
Baltimore, Md.

Astounded in Nashville

As the press for our industry, you should be aware of an event that happened here on Oct. 13. I hope you will become interested enough to do something about it.

Robert Sherin has been crusading through the courts fighting software taxation. Sherin was here in Nashville to fight a Tennessee software tax through federal court. He lost.

I was in the courtroom with him, so I know exactly what happened. I was completely astounded by what the judge, L. Clure Morton, said.

The issue was simple. The Supreme Court of the State of Tennessee, in the Commerce Union Bank vs. Tidwell case in June 1976, found software to be intangible and nontaxable.

In spite of this, in April of this year, the governor of Tennessee signed into law a bill that said software is tangible and taxable. Sherin sued to have this law nullified because the court had ruled just the opposite just 10 months before.

Morton said that "a legislature could call a male a female and a female a male if it wanted to and that it could call a white a black and a black a white." If this is true, imagine the implications here!

He also discoursed on the equal status of the legislature, the courts and the administration. In effect, he didn't say anything rational to me, but made a statement that Sherin could "take it up" — meaning take the case to the appellate court.

Taxation, of course, is crucial in all our lives and maybe software is taxable. But when the legislature and the Supreme Court of a state take diametrically opposite views on a matter as important as taxation and a single man, even though he is a federal judge, dismisses one of the protagonists out of hand as he did Sherin, it's time somebody did something.

Morgan W. Huff

Nashville, Tenn.

Turing Text Forthcoming

The article "Languages in Deep Trouble: Turing Winner" (CW, Oct. 24) raised more questions than it answered. It did make me curious.

Please tell me how I can get a copy of the Backus Seattle speech.

A.T. Hethewey

Charleston, S.C.

The text of the Turing lecture is now being adapted and extended for publication. It will appear in the *Communications of the ACM* "probably early next year," according to an association spokesman. Ed.

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Result of Poor Management

DPers Victims of Undue Behavior Shaping?

The Human Connection

By Jack Stone
Special to CW

There is no question that employees of any business organization are properly required to conform to its business decisions. It is naturally assumed that these decisions are effective ones developed by experienced, intelligent managers.

But in reality, all of us have been forced, from time to time, to wallow in the business swill that results from management decisions that range in quality from the ridiculous to the idiotic. Are companies aware of what the pressures of incompetent managers can do to the mental stability of the serious-minded employee?

Just read this letter from a reader who has had to endure the grim psychological fallout from bleak management in a large computer manufacturing firm.

Dear Jack:

I have been following your series of articles with great interest, being a computer professional who has occasionally exhibited human traits. I think it might be worthwhile to investigate the behavior modification and psychological conditioning that goes on in large organizations, however unintentionally, to effect individual programmers and engineers.

Consider [my] case: an engineer who, in his career of a half-dozen years, has had experience in every area of computer science from integrated circuit layout to operating system design. He finds himself working for a large computer manufacturer performing a variety of duties on a product development team. If the team were well run, then this person could make a major contribution to the product design, given his better-than-average understanding of the global design decisions that need to be made.

However, the team is poorly run. Reprocessed technicians are doing the engineering job — designing the hardware. [Mechanical] engineers who have never even had a Fortran course are writing software disguised as "vertical microcode." And market planners are too busy promoting their pet functions to discover what product is really needed.

So what does our engineer do? Likely, he will try to turn the project around to whatever extent possible, both because he feels that this is what the company is paying him for and because of his professional pride — he wants to build a good product.

He fails, however, to reckon with the Peter Principle and Parkinson's Law — managers prefer employees who don't make waves. Our engineer soon finds himself sidetracked on some job for which he is "desperately needed," such as programming a widget to work sideways and upside down ... Always, of course, there is the promise that he will be given more control over the product architecture as soon as he is "free."

So what happens? The product gets developed at considerably more expense than would have been required if our engineer's suggestions had been followed, and its function and performance are considerably inferior to competitive products. To rub his nose in it, our engineer has to spend the first several months after the product is shipped traveling around the country fixing the technician's hardware and the mechanical engineer's software.

If this hasn't been enough to break the spirit of our engineer, then management arranges to promise a position of increased responsibility on some follow-up product. Once again, his suggestions are ignored, usually in the name of avoiding hardware or software changes (although all of it will end up being changed anyway). And once again, he ends up getting shuttled off on some side issue.

So what is happening to our subject psychologically? If he is at all malleable, he learns to keep his mouth shut and do whatever job is assigned to him. He thus becomes management material. If our subject is made of sterner stuff, he is in a psychological and moral quandary: Doesn't he have a responsibility to the customer to build the best product possible? Shouldn't the product be designed as effectively as possible so that it won't have to be redesigned two years later at great additional expense? Such a dilemma is a textbook cause of psychological crisis.

So our engineer ends up getting hauled off to the loony bin; or he becomes a beachcomber in Tahiti; or he spends all of his spare time milking cows on his hobby farm and waiting for retirement. In any event, the industry loses a valuable contributor to the advancement of computer architecture...

My final question is this: To what extent is this psychological pressure an accidental side-effect of managerial incompetence, and to what extent is it the purposeful result of the personnel manuals and management training seminars that are rampant in my company (and yours?)

Letters to Stone should be addressed to him at Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007

Management as Scapegoat

Marketing Practices Cause of Poor Controls

The Taylor Report

By Alan Taylor CDP

The IBM-funded report from SRI International that has been talked about for years has now arrived [CW; Oct. 24] and has made internal auditors and management scapegoats for lots of problems.

This thesis started — as far as I am aware — with the accusation that internal auditors were almost totally ineffective in limiting computer crime, although they were in the best position to do so. It leads to the conclusion that more DP use by more DP-trained auditors (and management) is the best approach to take now.

As a conclusion, this is comfortable to both the accused auditors (who get more jobs) and to computer vendors (who sell more auditing applications). It is not, however, agreeable to management, which is being accused of "abdicating" its responsibilities.

The report described management's action as an "abdication." However, is there any evidence that management acted voluntarily in releasing what are now regarded as essential controls, or in not building in new ones, as they became necessary with the advent of data processing? If there is, then I have yet to see it.

In fairness, until it is shown that management was in fact acting voluntarily, it should be assumed that there was some business or other constraint that compelled it to act in this now-condemned manner. After all, it is highly unlikely that managements of thousands of businesses in hundreds of countries would simultaneously go soft in the head and expose their operations to many dangers.

Personally, I think there was, and indeed still is, a major constraint acting to keep management in a situation of weakness in the face of computer operations. This is the combination of the state of the art and the marketing methods that have been developed and used on a worldwide scale.

State of the Art

There is no doubt that during the period 1955 through 1977, the state of the art in computing has been changing and improving. Every improvement, be it in hardware, software, application or environment, has meant that new and better methods became available.

The very fact that they were new meant their problems had not been fully appreciated. Consider, as a recent example, the problems of converting from one data base management system to another. As the currently reconvened NBS/ACM [National Bureau of Standards/Association for Computing Machinery] Fort Lauderdale conference is finding out, it is much more difficult to move from one DBMS to a later-generation one that it is to move to a DBMS in the first place.

Yet, when people started moving into early DBMS operations, this negative factor was simply not foreseen, or brought out.

Equally, in the case of computer programmer crime, when commercial applications were started, there were so few experts on any particular hardware/software combination that there was no worry about some outside, unknown enemy being able to infiltrate a system. Any infiltrator would have to be an insider and it would be pretty obvious who it was. Now, when thousands of people can find the weaknesses of most common hardware/software applications without even coming into the organization, the situation is dramatically changed.

So, the state of the art was such that swift adoption of new methods was and continues to be dangerous. But, the obvious advantages of state-of-the-art computers have made their use effectively obligatory to management.

What went wrong, then, was not the use of untried methods, but the lack of adequate warning and proper instruction as to the allowances that should be made for any dangers. Neither management nor the advancing state of the art can be blamed for that...

That ignorance was the result of three almost universal marketing strategies.

- To leave out any allowance for nonobvious problems in the cost-justifications offered to encourage equipment purchase or rental.
- To sell only on contract terms which were totally one-sided.
- To complain to upper management that anyone who challenged the inadequate cost-justifications was being "obstructive," or simply not up to understanding computers.

A more reasonable and even-handed partnership between seller and buyer is possible even now. There are many things coming that will have great advantages and concealed problems. But one-sided accusations against management for abdicating its duty — when it was, in fact, deposed by marketing tactics at a time of swift and valuable advances — delay rather than hasten the day we will get that partnership. The SRI report should be withdrawn and replaced by a neutrally funded one.

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Letters to the Editor

Job Accounting Systems

I enjoyed Lawrence Cooke's article "Perfect Chargeout Just Not Obtainable" [CW, Oct. 17]. The problems he alludes to are so large and confusing that our firm has chosen, for the time being, to ignore a mechanized job accounting and billing system along with its incumbent and sizeable overhead.

Most job accounting systems of which I am aware have the same drawback. They alienate users by presenting bills in indecipherable terms.

Suppose your laundry operated in the same manner as a DP department and sent you a bill in their units instead of yours. It may read as follows: "525 gallons of water - 15¢, 48,000 BTUs to heat water - 37¢, 22 lbs. soap @ 10¢ = $2.20, 74 hangers @ 3¢ = $2.22, Tuesday schedule - 75¢, Labor - $40.00, Total Due = $45.67."

Nowhere have you been told in your units (e.g., shirts, pants, dresses) how much each costs and concomitantly what can be done to reduce the bill. Your laundry manages to solve the complex billing problems of space utilization, priorities, efficiencies, demurrage, etc., and it would assist DP public relations if we would learn to think and bill in terms of the user's units.

The billings produced by most job accounting systems are a technocrat's voluminous, detailed half-baked attempt to solve a business problem. The attitude is often "If we have to produce a bill, by God, we'll produce a big, complete one."

The future of information systems in any company depends on our ability to successfully look, act, talk and walk like the other ducks. As long as DP management provides arcane reports full of our units (EXCPs, on-line bytes of storage, tapes mounted, etc.) instead of user units (invoices read, purchase orders written, passengers booked, etc.), we will be disparagingly regarded as "technical management" but not "management."

I look forward to reading more articles on job accounting sytsems.

Geoffrey S. Hicks
Atlanta, Ga.

Delicate Situation Abroad

Thank you for the coverage you are giving my country in both articles and letters. The recent references to IBM, the Anglo American Corp. and the question of business ethics as applied to our troubled situation are entirely relevant to all your South African readers and to anyone else interested in the social implications of capitalism.

Your wider readership may like to know that both the companies mentioned above are well known here for their progressive employment practices, IBM as a leading foreign company and Anglo American as the largest South African private-sector mining and industrial group.

As a former employee of IBM, I have had the pleasure of watching a young black school-leaver who joined IBM as a clerk-cum-messenger a few years ago rise through the ranks to become a responsible manager. Although this is not an isolated case, there are still regrettably few organizations where merit can be recognized without the intrusion of the color bar.

If pressure on foreign companies such as IBM grows to the extent that they curtail their operations or withdraw from South Africa, an active, though subtle, force for change in our society will have been stopped.

Frank Cary has indicated that his company is already selecting its customers in this country based on some sort of human rights criteria [CW, Sept. 19]. This has left me with the sneaky feeling that, if pushed too far, his policy will lead our government into an official reprisal. That could adversely affect all IBM users, "goodies" and "baddies" alike, not to mention the almost 1,500 IBM employees in South Africa.

I should be interested to read more news and comment on the issue of doing business with us South Africans.

John Coombe
Durban, South Africa

Irresponsible Reporting

The Sept. 19 front-page article headlined "Alternatives Catch Eye, Not Buy of IBM Users" encompasses unethical practices of gathering information, irresponsible editorial license and distortion and inaccuracy in reporting.

I am not alone in my posture relative to the article as evidenced by a number of calls I have received, some of which were from others "quoted."

Computerworld is well known for its survey-type activities, and I have frequently responded to questionnaires and calls from CW and others. When responding, I give personal opinions and in no way represent myself as a spokesman for the Joseph Schlitz Brewing Co. I am certain that many others quoted responded in a similar vein.

I do recall a call from CW, and at no time was I ever advised that that information was for publication. Had I been so advised, I would have insisted on reviewing the article first. Without going into specifics, the quotes attributed to me were incorrect.

If CW wishes to report on the posture of large companies, it should go to appropriate levels and not to a DP manager, systems analyst or anyone who answers the phone. In addition, if it is gathering information for publication, it has an obligation to make its intent clear.

R.L. Babcock
Manager, Information Processing Services
Joseph Schlitz Brewing Co.
Milwaukee, Wis.

Bogged Down in Licensing

How pleased I was to hear from my friend Ken Lord again [". . . And In This Corner," CW, Oct. 17]. Ken is an energetic and persistent campaigner, but I wish he would turn his considerable abilities toward more important problems.

His campaign is based on three assumptions all of which are clearly false:

- That licensing or certification will eliminate shabby practices among shabby practitioners.
- That standards of practice can be generally agreed upon for various specialties within the industry.
- That the issue is still alive among any number of influential people in the industry.

The fact that the issue "still won't die" does not imply any merit in the idea; witness that voodoo, phrenology and belief in the Easter Bunny persist as well.

Steve Schiavo
Arlington, Va.

Mature, Level-Headed?

Frederick G. Withington, obviously smarting from his recent chewing out by the courts, has indeed displayed great "maturity, humility and level-headedness" in his latest verbal dump aimed at making the DP manager the scapegoat of the industry ["DP Managers Still in Adolescence," CW, Oct. 17].

That just goes to prove that it takes more than a raft of bits and bytes to assemble a few logical words. Thanks for the suggestions, Withy!

James G. Phillips
Lake Oswego, Ore.

Systematic Kiting

In regard to Alan Taylor's Oct. 3 column about ethics questions, it is my understanding that any competent high-volume cash management system already "systematically kites checks" in the sense of allowing checks to be written on funds which *will* be on deposit rather than funds which are on deposit. The system then helps make sure the required funds are deposited as needed. That's where the term "cash management" comes from.

I think Taylor needs to do some homework. He may also want to reconsider some of his rather provincial definitions of ethical behavior. It's not nearly as simple as it looks.

Laurance F. Wygant
Schaumburg, Ill.

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Grasshoppers vs. Ants: On-the-Job Performance, Not Certificate, Matters

By Joe Rigo
Special to CW

Every industry has its ants and its grasshoppers. The ants do the work. The grasshoppers sit around the hotel bar and talk about professionalism.

The ants get the promotions and the pay raises. The grasshoppers have more fun.

That is, most of the grasshoppers have fun. A few miss out. They are the ones who worry a lot. Mainly they worry that the ants are giving the profession a bad name.

Which brings me to the Institute for the Certification of Computer Professionals. The institute was set up a few years ago to sell certification exams to the data processing industry.

From the start, the institute's leaders realized they had a problem. They knew there was no good reason why anyone would want their product. They knew their certificate would not help a person get a job, win a promotion, lose weight or find a better sex life.

So they elected to pursue their goal by repeatedly pushing three arguments:

- The profession is populated by boobs and scoundrels.
- The industry must regulate itself voluntarily or the government will force licensing on us.
- Certificate holders are the only true professionals.

The institute never made much effort to prove any of these points, which is understandable. It is hard to argue massive incompetence at a time when we are surrounded by working systems and bright new applications.

The threat of forced government licensing is another spurious issue. There is no way such a program can get the support it needs while we still have a shortage of trained specialists.

The main effect of any licensing program is to restrict the entry of new people into a profession. In our field, the technology is evolving as fast as ever, and it is always the new people who are most comfortable with the latest goodies. We need them too much.

As for the alleged superiority of certificate holders, no one knows. The institute can't say whether its alumni have become pillars of the profession or hatchet murderers.

Equality in Failure

There has been some research, however, and it is the main reason for this essay. It concerns the test for the Certificate in Data Processing (CDP).

One of the institute's committee chairmen, Pat Smith, conducted a review course for the CDP exam at the University of Manitoba a few months ago. He found that applicants with college degrees in computer science who took the course had no trouble passing the exam.

They breezed through the technical parts, which was expected. They also breezed through the management and accounting sections, which was not supposed to happen.

On the other hand, the failure rate was almost 100% for graduates of two-year community colleges and vocational schools.

Smith's report should warm the hearts of college deans from Harvard to Stanford. They can sleep peacefully, knowing that the institute endorses their work.

At the same time, it shows that the certification process offers no guidance in the one area where it might be helpful. The test does not separate the good two-year courses from the bad. All fail equally.

Reader Commentary

Directors of the institute were a little upset to learn that people with no management experience were doing so well on their test for managers. But they didn't let it bother them for long. They plunged right ahead with their new examination for senior programmers.

The new exam has one big thing going for it. Anyone can qualify.

The big market for certificates is among recent college graduates while they are still inexperienced and insecure. Up to now, they had to wait three years before they could qualify for a CDP. By then, most lost interest.

There is no waiting period for the new certificate. It should be enormously successful.

Recent college graduates may not be able to find their way to the coffee machine without a guide dog. But their education has trained them to be absolute experts at passing multiple-choice tests prepared by college professors. And that is exactly what the new exam is.

I predict that we are about to have a massive explosion in the senior programmer population. It has become possible for hordes of eager young people to graduate on Monday, take the test on Tuesday and show up in the employment office on Wednesday, happily clutching their programmer credentials.

The one good thing is that all of this should drive the old CDP exam out of business. People with one certificate are not going to want to get another three years later.

This will leave the old-timers with a certificate that no one recognizes anymore. Some will take the new test, but at the risk of finding that their skill with multiple-choice questions has faded.

The others will simply have to go on proving their professionalism by their daily performance on the job.

And that, after all these years, is still the way that we separate the grasshoppers from the ants.

Rigo is president of Sysdoc, Inc. in New York City.

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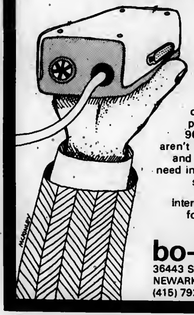

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Users' Report...

"Winning Proposal" Winning Big

A step-by-step guide to proposal preparation is now helping many computer/EDP firms score big wins in their proposal efforts. Users of the book, entitled *How to Create a Winning Proposal*, report an impressive 42% average increase in the success-ratio of their proposal projects. Of the companies polled, 68% attributed their successful track record to the guidelines provided in the book.

Dubbed *"Winning Proposal"* shortly after publication, the much-needed volume has rapidly become an international standard guide for use in both government and commercial proposal efforts requiring a high level of sophistication. It covers the entire proposal process from start to finish . . . giving detailed instructions on contents, structure and methods of preparation for solicited as well as unsolicited proposals. Technical, cost and management section checklists are included to ensure the proposal team of covering all the important bases.

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Microwaves Sept. 1976

That "Winning Proposal" is effective in proposal preparation is evidenced by its wide use in GSA, DOD, NASA and the military . . . as well as in varying sizes of national and multi-national corporations. For many project managers, it is a virtual lemonade-stand in the Sahara because of the valuable assistance it provides. All agree that the most outstanding feature of the book is usability. It enables the user to actually plan, write and submit a superior proposal with a high win probability.

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Convair Managair Feb. 1977

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Not a Technical Issue

DP Ethics No Different From Business Ones

By Paul Sita
Special to CW

Reader Commentary

As the field of data processing matures, questions of ethics are becoming increasingly prominent. Whole groups of related issues are being discussed — the legal status of software, the ownership of employee-produced routines, responsibility for errors in computer systems which automatically transfer funds, etc.

The apparent ease with which the computer may be used to distort corporate accounting records and the difficulty of detecting these distortions boggles the mind.

With technology advancing more rapidly than our ability to comprehend its implications, questions of ethics and the development of the field as a professional discipline has taken a back seat to the technical issues.

Admittedly, the task of applying the latest technological advances to create computer systems that work has been difficult. But with less emphasis being placed on technology for technology's sake and more being placed on the efficient end productive use of technology, questions of ethics are arising and must be met head on.

The position in which we find ourselves at the present is a precarious one. The very usefulness of the industry and its continued growth depends upon the development of the profession as a profession *within* the mainstream of American business, not outside of it.

DP can't be thought of simply as wizardry, with no logical means of evaluating it or the people who practice it. Such an attitude can only detract from the field. The current controversy over the Certificate in Data Processing and the Certificate in Computer Programming bear this out.

What I want to suggest is that we do not have an impossible task before us. In fact, the problem of ethics in DP is simply the problem of ethics in business — nothing more, nothing less.

Although the computer acts as a microscope, magnifying the effects of our procedures, practices and policies, the same kinds of issues can be raised without the computer.

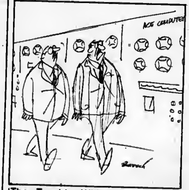
The problem is not a technical one. If we look for "discoveries," we will not solve it. The problem is not one of discovering new ethical standards, but of applying the standards we already possess to a new technology.

It is a people problem. We need to develop an awareness of the fact that DP systems do raise questions of ethics and that these questions are not very different from the general question of the ethical conduct of business.

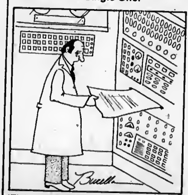
By their very nature, ethical questions do not lend themselves to the simple packaged set of answers we would all love to have. What is required is much more complex — genuine concern, thoughtful discussion and a pooling of insights and experiences.

As is always the case, defining a problem is the first step toward its solution, and this problem is no different from any other.

Sito, who is studying for his doctorate in philosophy, is DP manager for a Long Island-based firm in the home financing field.



'The Trouble With Them Is, You Can't Get a Single Meek Kowtowing "Yes" Out of a Single One.'



'Flying Saucer in the First, Lucky Lucy in the Third, Two and Eight in the Daily Double . . .'

Why the "Chainchart" of the LogicChain System obsoletes previous automated "flowcharting systems" for COBOL users

What is a flowchart?

It is not a flow of a chart. And it is not a chart of a flow. Both the words "flow" and "chart" are adjectives. Therefore, a "flowchart" must be a flow of *something*. It could be a flow of a water system, a process system or any type of system.

In the case of a computer program flowchart, it is obviously a flowchart of procedural statements, i.e. logic (a sequence of events when seen as predictable). It should indicate the procedural linkages, so that what is *actually* needed to a logic *linkage* chart. However, if only linkage *segments* are shown within the chart, the chart does not replace either the Procedure Division Source or the Procedure Division Cross Reference. It simply adds a new document which is required to be consulted.

What is a Chainchart?

A more precise word to replace the word "linkage" to insure that the complete set of logic linkages (flow) are shown within the chart, is the word, "chain". This defines that *all* linkages are shown within the chart rather than simple linkage segments.

Previous "flowchart systems" have never shown anything more than simple linkage segments within the chart. This was equivalent to a person reaching into a barrel for a chain and finding only linkage segments.

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Reader Commentary

By Walt Gibson
Special to CW

I read "IBM Designed to Monopolize: McAdams" [CW, Oct. 3] with great interest. Unfortunately, I cannot agree with most of the points made by these "expert witnesses" about the "fighting machines."

I do not have access to information about IBM's premature order acceptances and therefore cannot comment on this aspect of the "fighting machines." IBM has a habit of introducing "new" concepts slowly into a present product line, thereby debugging the problems on a single machine rather than across the entire product line, as other vendors do. To wit:

- The 360/25 CPU has reloadable control storage and loadable nonresident microdiagnostics. It also has available integrated reader, punch, printer, disk and communications adapters.
- The 360/44 has increased processing speed brought about by relocating the general-purpose registers from slow core storage to storage with 250 nsec access time.
- The 360/67 hailed the introduction of the Virtual Storage/Dynamic Address Translation facility.
- The 360/65 has a 16K-byte buffer storage to improve processing speeds.
- The 360/91 has multiple execution units for concurrent instruction processing.

Now let's explore the 370 series:

- The 370/125, a step up for 360/25 users, has integrated adapters (this is anticompetitive?). The 360/25 was the primary pilot processor.
- The 370/135 has integrated printer, communications and disk adapters available. Diagnostics are loaded into reloadable control storage.

The CPU goes through a hardware checkout as the customer is powering up and Virtual Storage is standard. The 360/25, 30, 40, 44 and 67 were the pilot processors.

The 370/145 has extended microdiagnostics and the customer 370 emulation coreload loads into reloadable solid-state control storage. The 370/145 separated from microcode certain instruction preprocessing functions that were put into the "I cycles hardware." The pilot processors were the 360/30, 40, 44 and 67.

The 370/155, one of the first 370 CPUs, brought monolithic systems technology into the product line. There was a 370/155 logic card repopulation program to correct certain hardware problems. VS was a large cost option. A buffer unit speeds instruction and data processing functions. The 360/44, 50 and 65 were the pilot processors.

The 370/156 eliminated the 370/155's read-only storage by replacing it with reloadable control storage. A CRT was used for console and maintenance purposes. An extended front-end service processor aids the customer engineer.

The "S" disk records the last eight CPU and/or channel failures to aid in problem resolution. VS is standard, as is a high-speed buffer unit.The 360/25, 44, 50, 67 and 65 were the pilot processors.

The 370/165 uses the same channels as the 360/65 and also makes the 2660 channel available. The 165 has separate instruction fetch and execution units. A CRT is the console I/O writer.

Nonresident microdiagnostics aid service personnel.EPVS is a high-cost option. The 360/25, 44, 65, 85 and 91 were pilot processors.

The 370/166 has hardware enhancements to the 165; the core storage was replaced by solid-state storage. An extended service processor is provided. VS is standard. The 360/25, 44, 65, 67, 65 and 91 were pilots.

As can be seen, features or hardware that were unique to certain 360 series processors are standard on most 370 series processors. Some of these processors, like the Model 67, were corporate "losers."

The R&D work of the VS concept on the 360/67 has shown up in almost all the 370 series processors. What unique ideas introduced on the 370 series processors will become standard on the "Future Systems" from IBM?

IBM started out small in the tab card business. It has excelled and evolved to its present position through a dedication to product support and service to the customer.

I have never been an IBM employee because of the corporation's views on long hair, beards, bluejeans and cowboy boots on field service personnel, so no information you have just read is IBM confidential.

If the Justice Department wants a real view, why not ask the computer engineer on the street about monopolies, IBM, Control Data Corp., Memorex, plug compatibles and the like?

I'll be happy to testify.

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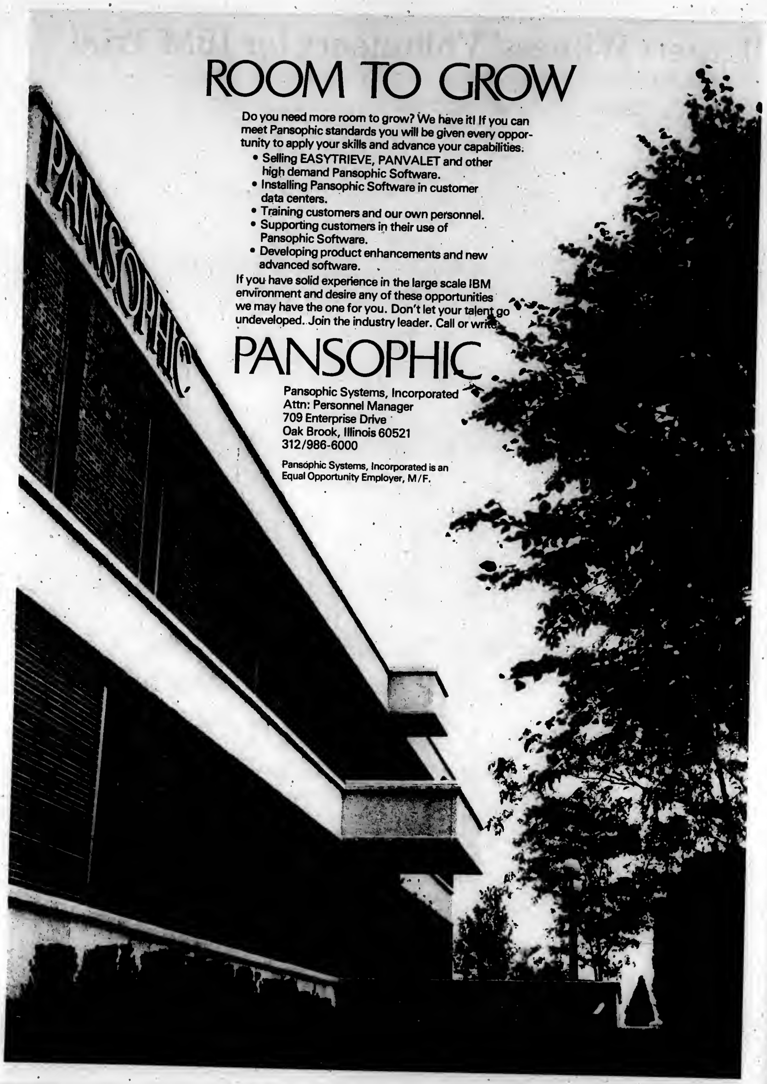

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IPT Gains Difficult to Measure: Chase

By Molly Upton
CW Staff

NEW YORK — When implementing improved programming techniques (IPT), managers must increase the project schedules and initial cost allocations, according to two veterans of the IPT program at Chase Manhattan Bank.

Roger Van Ghent, senior consultant at Chase, and Willard Cohen, vice-president, told a session at a recent conference here that measurement of productivity increases is often difficult if not impossible because of the unstructured environment that previously existed.

Users must recognize that in the early phases of a project, many of the new tools and techniques have a negative impact, such as higher costs and increased time, Van Ghent said.

For instance, structured coding produces a greater number of lines, and "walk throughs" take more time, Cohen said, but the rewards are most likely to come in the testing and maintenance cycles. There is a positive synergistic effect that results from the integrated use of multiple tools, he added.

With the use of the new techniques and the structured life cycle concept, the focus of the DP shop should be able to turn to solving real world problems instead of solving DP problems 70% of the time, he added.

Use Small Entities

In endeavoring to measure results, module users should look for the cost, errors and compiles per module and per thousand lines of code (Kloc) as well as the time to find errors per module and per Kloc, he said.

"If you do this, please publish the results because everyone is looking for them," he said.

To establish some means of measurement, an installation should obtain a base line "on whatever measurement you've used," establish goals and modify the program as more is learned, he added.

Charisma vs. Fiat

There are several methods of installing improved programming techniques, Van Ghent said.

About 30% of firms using them implement them by fiat, while 70% rely on charisma, he said. Chase started by fiat, declaring this was the way, and now charisma or programmers' enthusiasm is sufficient, he said.

Chase, which has about 500 applications programmers, is basically a large centralized batch shop, Cohen said.

When the bank decided to implement the improved programming techniques, it was experiencing all the generic problems such as poor communications between DP and users; solutions didn't match the problems, he said.

The bank had high continuing costs and unhappy users. Often the definition of the problem was left to DP, with user approval granted on a perfunctory basis, he said.

There are four phases involved in the structured life cycle: analysis, design, implementation and maintenance, Van Ghent said.

In the design phase, they recommended development of guidelines and a training program, trying techniques on real tasks, starting a program reference library and implementing the use of the techniques immediately after education.

Added Benefit

Chase found a side benefit when it applied the new techniques to writing the program reference library routines; they "sailed through with zero failures," he said.

The implementation phase involves training teams, not staffs, using the techniques immediately and allowing a long learning curve, probably twice as long as one thinks necessary, they observed.

Project schedules should be modified at the beginning, failures should not be penalized and successes should be rewarded, they said. Managers should worry about efficiency later and concentrate on implementing the new methods, Van Ghent added.

Sigmetrics, CMG Plan Joint Meeting

By Don Leavitt
CW Staff

WASHINGTON, D.C. — Modeling, measurement and management are the three concurrent themes of a major four-day conference on computer performance scheduled for the Twin Bridges Marriott hotel here from Nov. 29 through Dec. 2.

The conference combining theoretical and empirical approaches and experiences over a full range of computer performance evaluation (CPE) activities, is sponsored jointly by the Association for Computing Machinery, through Sigmetrics, and the Computer Measurement Group, Inc. (CMG).

One of the highlights of the conference will be the presentation of the annual A.A. Michelson award for outstanding contribution to the field of CPE.

The two groups ran concurrent conferences in Montreal several years ago, but this meeting represents joint planning from the start so that all attendees can benefit, according to conference chairman Robert Bishop of Ernst & Ernst. This meeting, Sigmetrics/CMG-VIII, is open to anyone interested in CPE, he emphasized.

'Keynote' Paper

An invited paper entitled "A Basis for the Performance Evaluation of Information Processing Systems," to be presented by associate professor Thomas G. DeLutis of Ohio State University, is scheduled for the first morning of the conference and will serve effectively as a keynote, Bishop said.

Technical sessions after that will fall into several general categories including CPE methodology and applications, tutorials, panel discussions and vendor presentations. Speakers and session chairmen represent a mix of backgrounds from academia, industry and government.

Within the methodology segment, CMG president Don Deese, a manager at Fedsim and president of CMG, will chair a session on performance factors while Robert Morrison, program chairman and IBMer, will run one on monitoring and tuning aids.

"CPE Applications" will include two sessions — one chaired by Linda Wright of Suntech, Inc. and the other by Phil Kiviat of Fedsim — on systems and subsystem evaluation. "Structure and Design Considerations" will be considered in a session to be run by IBMer Herb Blomquist.

Tutorial sessions will touch on such subjects as data sharing, operational overview of queuing network models, performance management of a data center and an introduction to software physics.

People wishing to attend the conference may register ahead of time for $110. At the door, the charge will be $125 for the entire meeting or $45/day, Bishop noted.

Preconference registrations, including payment, should be sent to 1977 Sigmetrics-CMG VIII Advance Registration, attention Steve Sensabaugh, Tesdata Systems Corp., 7900 Westpark Drive, McLean, Va.

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'Speed' Enhances SAM File Use Under DOS/VS

FAIRFIELD, N.J. — The Speed package now available from Macro 4, Inc. was designed to provide greatly increased throughput for IBM 370s running under DOS/VS by speeding the user's disk I/O operations.

Speed works directly with disk files organized under the Sequential Access Method (SAM), but may impact an installation's entire operation even if SAM-based work is only a small part of its total workload, a spokesman claimed.

The package overrides the user's predefined block sizes; it reads or writes a full track or multiple tracks in one I/O operation. Typically this boosts throughput in SAM operations anywhere from 15% to 35%, the spokesman estimated.

Because Speed reduces disk arm movement and channel time, these resources are available to jobs working with Direct Access, Isam and Vsam files. Thus even jobs not using Speed directly may benefit from its presence, he contended.

Speed can operate in automatic, semiautomatic or selective mode. In all cases, however, the package can be turned on or off for the entire system or for individual patitions.

This is particularly important, the spokesman said, for installations where there is a danger of overcommitting memory at certain times of day.

Speed also supports 100 read/write retries in case of a problem.

Speed is available on a rental/lease basis in the $150- to $300/mo range depending on features selected. It is also available on a perpetual license, Macro 4 said from 376 Hollywood Ave., Fairfield, N.J. 07006.

Infonet Installs Cost Forecaster

EL SEGUNDO, Calif. — A cost-forecasting system that enables corporate planners to project and compare their manufacturing costs in 15 countries through 1982, Simcost II is now available on the Infonet remote computing network of Computer Sciences Corp. (CSC).

Arthur D. Little, Inc. of Cambridge, Mass., developed the management tool for the electronics, electrical and light mechanical industries. It was designed to help such areas as in investment planing manufacturing strategies, competitive costs evaluation and manufacturing sites selection.

Simcost II consists of a mathematical model and a data base that contains economic forecasts of the cost factors involved in the manufacturing operations of the target industries. The forecasts cover the period 1977-1982, the spokesman said.

Forecasts include both major industrial countries and less developed ones favored for off-shore manufacture, he explained.

The data base covers labor factors, including direct wages, taxes and fringe benefits expected, for 14 skill levels. Forecasts also cover worker productivity and production hours actually worked, the spokesman said.

Forecasts of transportation costs and prices of the 26 materials most widely used in the target industries are also part of the data base, as are forecasts related to some two dozen component or semifinished materials, he said.

Infonet customers subscribing to the service will pay a subscription fee to Arthur D. Little. The fee for first-time users is $25,000; for current subscribers to Simcost I, the fee is $12,000.

Arthur D. Little is at Acorn Park, Cambridge, Mass. 02140. CSC is headquartered at 650 N. Sepulveda Blvd., El Segundo, Calif. 90245.

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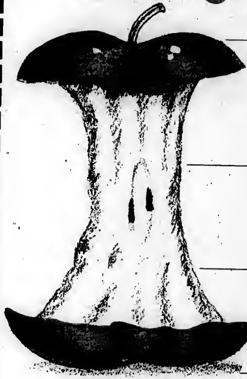

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Structural Complexity Factor in Data Base

By L.E. Towner
Special to CW

The recent emphasis on data bases has led to visions of immense pools of information providing total coverage of an organization. Such a data base contains data on many diverse applications and functions of the organization. The result can be mind-boggling.

When data base people discuss the size of data bases, the discussion gravitates to the volume of data to be contained in the data base. The term "very large data base" is generally used to define data volume. What few designers discuss and consider is the *scale* of a data base.

It is true that the data volume considerations are very important to the design and selection of data base software and that volume can make or break a data base management system (DBMS). The other side of the coin, however, is similar to the part of an iceberg under the water.

When first entering the data base arena, few potential users look at the end result of their endeavors, usually because the initial implementation of a DBMS is intended to support a specific application or functional area. The designers intend to expand into other areas "when everything is going smoothly." Unfortunately, this may be too late to prevent a costly and time-consuming design change.

The approaches used to design an integrated data base will vary widely depending on the overall scope and scale of the design. As more and more applications are added, the complexity of the structure increases.

The cost and time required to integrate each new application are represented by an inverted pyramid, expanding upward until the cost-effectiveness of integration is lost. A point can be reached where further integration is impractical.

Another problem of full integration is the serial nature of the integration process. While development of new applications is practical in parallel, final integration with the operational schema must be serial. Users rebel against the delays such an approach dictates.

Bad Dream

Initial experience developing a very complex, integrated data base bears this. A fully networked data base structure becomes very complex as many data relationships develop. Previously independent applications turn out to be highly interdependent and the nightmare begins.

A better approach is required to effect integration of large-scale data bases. Data volume becomes less of a limiting factor in data base design and implementation than the scope of coverage of the data base.

The purist approach to data base integration eliminates as much data redundancy as possible. The practical view is that some redundancy must be present to make processing efficient.

When many applications make use of common data, it is very difficult to maintain current operational use of that data while developing new uses.

A better approach seems to allow each application to treat all data as if it were the only user, while actually separating common data into a user-independent area. This technique permits parallel development of multiple applications while protecting the operational data base from inadvertent damage. Each application supports a planned-redundant record which points to the common data.

This approach has several pluses and minuses. The pluses include:

- Independent parallel development of applications.
- Reduction in schema structure complexity and pointer overhead.
- Increased safety of the operational data.

The minuses are grouped around a degredation in retrieval speed due to secondary accesses of shared data. The complexity of retrieval software increases, but the user's ability to access the data base increases also.

A data dictionary facility which recognizes synonym record names is essential to effective use of the described technique. Keeping control over the data base structure and track of where the data is located without a dictionary will require extensive supporting software. Such software will likely cost more to develop than the cost of the dictionary package.

Planned redundancy can be a powerful tool in the design of any integrated data base and may make dramatic differences in its ultimate goal, the support to the end user.

Towner is head of the systems Management Division, of the Naval Intelligence Processing System Support Activity in Alexandria, Va.

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Conversational Text Editing

Vtam Support Highlight of 'Mentext' Update

PALO ALTO, Calif. — Release 5 of the Mentext Conversational text editing and programming system from Mentel, Inc. includes several enhancements, the most significant of which provides Vtam support under the Mencom teleprocessing monitor, according to a spokesman.

Under Vtam basic mode, Mencom supports IBM 2740 models 1 and 2, 2741, 3735, 3740, 3767 and both local and remote 3270 terminals as well as "numerous other" communications units including Teletype models 33 and 35 and compatible teletypewriters, he explained.

Vtam record mode support for IBM 3270 and 3790 terminals operating under Synchronous Data Link Control (SDLC) protocol will be available shortly, he added.

Mentext facilities fall into five basic categories. Text management manipulates the contents of files made up of card images or print line images. Data set and catalog management displays data sets and their attributes as well as the contents of the catalog or a partitioned data set (PDS) directory.

Beyond that, the system manages remote job processing and provides an interactive language that can be used for such diverse tasks as JCL creation or letter writing, the spokesman claimed.

Mentext also supports document preparation facilities, including alignment, justification, pagination and indentations, he said.

The updated package can be used on IBM 360/370s under OS/MFT, MFT or the VS implementations.

Release 5 costs $25,500 to $35,000 depending on the operating system being used. Mentel is at 459 Hamilton Ave., Palo Alto, Calif. 94302.

Loan System Now Prints Federal Form

ORLANDO, Fla. — The Commercial Loan System package from Florida Software Services, Inc. (FSS) has been extended to produce federally required Commercial Loan Line Sheets, according to a spokesman.

The federal Office of the Comptroller of the Currency includes these Line Sheets as part of its bank examination process requirements, he said. They show current indebtedness and indirect liability status for selected customers, which may be printed on standard paper or special forms.

The enhancement also provides a report of indirect liabilities on delinquent notes. This report lists delinquent notes on a user-specified cycle for customers indirectly liable for each note.

The original application logic handled revolving credit, line-of-credit and partial advances on commitments as well as standard commercial loans. Written in Cobol, the package was designed for multibranch/multibank processing, the vendor said.

Under the FSS system, a "virtually unlimited" number of participations can be sold or placed against a note. Likewise, an unlimited number of collateral items can secure one or more notes, the spokesman added.

The package runs on Honeywell and Burroughs mid-range CPUs as well as IBM 360/370s. It costs $16,300 for IBM DOS and Burroughs users, $20,800 for IBM OS and $23,300 for Honeywell shops.

FSS can be reached through P.O. Box 2269, Orlando, Fla. 32802.

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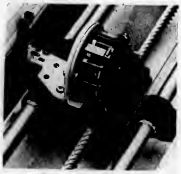

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Data Base Extensions Seen Top Products in '78

By Stephen L. Robinson
Special to CW

Data Base Corner

This is the time of the year for forecasts. Pundits are presently picking the winners in football, hockey and basketball. Seers are predicting which governments will fall, who will get married, who will be divorced and who will be assassinated.

Joining the ranks of the fortune tellers, I propose the following predictions for 1978:

- The vendors of data base packages will continue to expand their offerings of complementary software.

Data dictionaries, teleprocessing (TP) software, report generators and query facilities will lead the list. These packages will be closely bound with the data base packages. Logging and recovery, for example, will be synchronized between data base and TP packages. Report generators will utilize structure data such as imbedded and external pointers. Data dictionaries will be designed to operate in an active mode, although the burden of building the active mechanics will still be on the user. Query facilities will improve, but will still be rather primitive (i.e., not particularly English-like).

- Data base packages on

(Continued on Page 36)

Audit/Report System Uses IBM 3

WELLESLEY, Mass. — The EDP-Auditor/3 package from Cullinane Corp. is said to help nonprogrammers working with IBM 3s to generate both standard reports and audit-related analyses from their files.

Parameter-driven extraction support lets the user select data on predetermined criteria or sequential intervals. Bypass facilities allow the system to exclude unwanted records, a spokesman noted.

File matching functions allow users to work with two files in a single run, and sorting prior to use may be on as many as five data fields. Test runs can be used to verify data before complete file processing, he added.

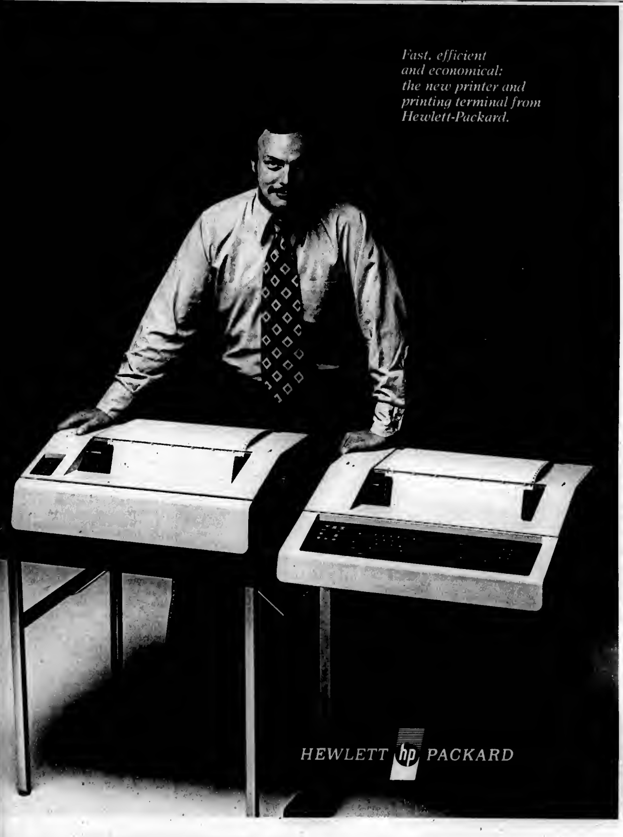
All basic arithmetic functions are available and the user may enter unique calculations for such operations as cross footing, extension checking and interest recalculations. The system can provide totals on the file and report level, the spokesman pointed out.

Functions for the auditor include aging of the data into a maximum of seven categories. Sampling of a file, including both proportional and attribute (frequency estimation) techniques, is built into the system, he said.

The preparation of balance and transaction confirmations and the creation of new files are also built in. Records selected according to random sampling or parameter extraction criteria may be written to a new card, tape or sequential disk file, the spokesman explained.

EDP-Auditor/3 is, in effect, an enhanced version of the Sys3audit package introduced last year by Computer Audit Systems, Inc. [CW, Oct. 11, 1976]. The rewriting and reintroduction at this time is part of an agreement with the originator, Cullinane emphasized.

Based on a System 3-oriented version of Cullinane's Culprit retrieval package, EDP-Auditor/3 is available for $7,500. Culprit/3, without the auditor-specific support, costs $5,000, Cullinane said from Wellesley Office Park, 20 William St., Wellesley, Mass. 02181.



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'C' Compiler Runs on PDP-11

NEW YORK — A 'C' compiler for developing structured programs on Digital Equipment Corp. PDP-11s is available from Yourdon, Inc. The C language was developed at Bell Telephone Laboratories for Bell's Unix operating system, which runs on the PDP-11.

Yourdon's version of C runs under DEC's RSX and will be available under DEC environments. An Intel 8080 version of the compiler is anticipated early next year, the spokesman noted.

Because of the table-driven design of the compiler, much of its code is portable, he explained.

A combined tutorial and reference manual developed by Yourdon is designed so that the machine- or operating system-dependent parts of the system are segregated into a single chapter. The remainder of the manual, therefore, is a valid description of the portable aspects of C, Yourdon stated.

The C compiler costs $11,575 on a permanent lease basis. Users are responsible for acquiring the RSX softare; it does not come with the compiler, the spokesman added from 1133 Avenue of the Americas, New York, N.Y. 10036.

Data Base Extensions To Set Scene in 1978

(Continued from Page 35)

minis will be a hot item.

Hardware vendors, in their fervor to sell minis to small businesses, will provide a variety of data base packages. Codasyl-like and Total-like packages will lead the parade, primarily because of their minimal core requirements.

- Many small businesses will become disgusted with computers and data base.

Minicomputer vendors are quite aggressive in their relationship with first-time computer users. The result is a user who is often convinced that the minicomputer is indeed the panacea that big computers are not.

Disasters Will Abound

The availability of a data base package is frequently a major contributing factor to this rose-colored view of data and information processing. Disasters will abound and will be well publicized.

- At least half a dozen large installations will change data base packages.

They will cite poor performance, complexity of use, and inflexibility as the major factors influencing their decision. Most such switchers would be better off fighting (apologies to the makers of Tareyton cigarettes). Precedent exists to suggest the organizations will probably be unhappy with their second choice as well.

The reason is quite simple. Most such organizations have not committed to the development of a data base system; they are merely using the data base package as an access method. Without organizational changes to accompany the package changes, data base success will rarely be realized.

- The major data base packages will commence advertising that suggest they are relational and/or distributed.
- IBM will

A. Hard-wire DL/1 commands.

B. Announce a "Codasyl" package.

C. Announce a relational package.

D. Develop a Series/1 with a 1M-byte memory to run DL/1.

E. Post record earnings.

F. Any two of the above.

G. All of the above (except F).

- At least two major software houses will announce data base packages.
- Papers will be published detailing the specifications for data base machines. Projects along these lines (e.g., Cullinane's) will continue, but don't expect to be able to buy one from your friendly vendor next year.
- Data dictionaries will begin to sell like hotcakes as more and more organizations recognize the value of taking an inventory of their existing systems.
- The Codasyl recommendations will once more not be accepted as a standard.

Robinson is an independent consultant, operating as S.L. Robinson & Associates in Morrisville, Pa.

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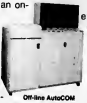

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December 1	San Diego, CA
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December 8	Tampa, FL
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January 12	Jacksonville, FL
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January 18	Chicago, IL
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Reloading Tough Work With Huge Data Base

By Dean G. Dardwin
Special to CW

SPRINGFIELD, Ill. — When the Illinois Bureau of Employment Security was commissioned to develop an on-line unemployment insurance claims processing system capable of paying claims in an accurate and timely manner, some type of data base management system (DBMS) was deemed necessary. The question was, which one?

While many factors were evaluated to determine which DBMS to use, there was still one unanswered question. The unemployment rate was climbing dramatically; no one really knew where it would stop. The DBMS chosen had to be able to store and allow rapid access to millions of data base records.

IBM's program product, IMS/VS, was selected. Both the data base and data communications functions were obtained. Eventually, the initial loading of the data base began. When the data base grew to the 11th 3330-11 pack, the load terminated.

Quite an Education

We received quite an education about Isam/Osam and relative byte addresses (RBAs). An RBA is a full word used by the access methods to locate a given physical record. Isam/Osam uses a signed high-order bit in the full word RBA, limiting the number of bytes per data set group (an IMS data base may consist of one to 10 data set groups) to approximately 2^{31}.

Two approaches were taken to solve the problem. First, a segment type that we expected to have high insert/delete activity was made a data set group by itself. Under certain conditions, a data set group can be reorganized by itself, without having to reorganize the entire data base.

Largest IMS Base

Second, as Vsam was available, a decision was made to utilize it. Vsam does not use a signed high-order bit in the RBA, allowing a maximum data set group size, in bytes, of approximately 2^{32}. After a one-week delay, the data base finally loaded successfully at 22 3330-11 packs. IBM informed us they knew of no physical IMS data base anywhere near that large.

What About Response Time?

Of course, there was much discussion regarding the response time we would be able to attain with such a large data base. After several months of tuning the hardware (370/168-MP), software (IMS/VS, IMS application programs, MVS, Vsam) and the teleprocessing network (300+ terminals distributed throughout the State of Illinois, 40 to 4,800 bit/sec remote lines), the 90th percentile response time, measured at the terminal, was under four seconds. Transaction volume varies from 50,000 to 100,000 per 10-hour day.

A Large Problem

While the response time is very satisfactory, the size of the data base still presents a large problem when reorganization is required. Reorganization is done by unloading and then reloading the entire data base. While the unload may run concurrently with on-line activity (no on-line updating is done), the reload may not.

The reload requires approximately 40 hours of elapsed time on the 370/168-MP system and is not restartable. Several reloads have failed due to tape I/O errors and other reasons, requiring the reload to be started from the beginning.

Everything considered, IMS/VS has proven to be the right DBMS for the situation.

Dardwin was previously manager of systems for the Illinois Bureau of Employment Security. Now he is vice-president of Chicago Data Systems, Inc., Chicago.

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New Carrier Offerings Foreseen

SNA Designed for Flexibility, Users Told

By Ronald A. Frank
CW Staff

WASHINGTON, D.C. — IBM's Systems Network Architecture (SNA) is designed to permit terminals and controllers to share the same line and to enable one controller to access different applications simultaneously or sequentially, according to G.P. Fusco, director of distributed systems at IBM.

SNA enables many applications to share a single network and thus encourages the distribution of information and processing to geographically separated nodes in a network, Fusco told a session on distributed systems at the recent Info/Expo '77 conference.

It is important for users to be able to accommodate new carrier network offerings and many "beneficial changes" will occur in this area by 1985, Fusco predicted. Some of these network services will be handled at the electrical level and will not involve programming support, but others will require major changes in the host and distributed processor programming.

The SNA goal is to minimize the changes to products and applications programs in a way that provides the benefits of these new services and allows coexistence of many service types as well, he said.

Three Components

The concept of SNA includes three components — the link, session and data stream control. And these components fit together in layers with link control at the lowest level and data stream control at the highest. The higher SNA levels are insulated from the lower ones, making them less sensitive to changes in each other, Fusco explained.

The arrangement of levels allows high-level functions such as data base executions to be implemented above and independently of the lower SNA levels. The high-level functions, whether developed by the user or IBM, can then be designed independently of the network or its terminals.

Under SNA, the goal of link control is to effect transmissions between adjacent physical boxes as reliably and transparently as possible. IBM today supports about 15 different teleprocessing link controls, but Synchronous Data Link Control (SDLC) was chosen for SNA because it meets IBM's design criteria better than either Binary Synchronous (Bisynch) or start/stop protocols, he said.

SDLC conforms to the international standard known as Higher Level Data Link Control (HDLC) and has features that accommodate new networks. In addition, SDLC is compatible with existing link controls, which is considered "an absolute must in our architecture," Fusco said.

The object of session control is to provide flexible and transparent connections between end users which can be people communicating with programs or programs communicating with other programs. To accomplish this, SNA defines a single set of protocols for the logical connection of programs in a host system with a downstream controller or terminal. This logical connection is called a session, he said.

System availability is enhanced because the session part of SNA coordinates all recovery actions. Session control also allows better remote job entry (RJE) performance and yields good results when mixing RJE

(Continued on Page 40)

Avis Planning Modernization Of 'Wizard' Network Service

NEW YORK — Avis has plans to modernize its "Wizard" network and expand its services to third parties, according to August Kohler, the company's director of telecommunications, speaking at a recent conference here.

Development of the Wizard system started in August 1969 with 1,400 pages of specifications. It included engineering of a split platten terminal with Sanders Associates, 250 man years to rewrite IBM Pars software to accommodate front ends, and the creation of a nonstandard line protocol.

The system was running throughout 48 states by June 1973, and now the firm would like to expand its reservations capacity, move its DP center, create second-generation terminals, link North America and Europe, install terminals at travel agencies and initiate computer-to-computer communications from reservations made by airline passengers on board planes, Kohler said.

Currently, the system also serves Hawaii and has 1,000 terminals as well as 200 CRTs at the Tulsa, Okla., reservation center. The firm has no active plans to initiate Synchronous Data Link Control (SDLC), he added.

The Avis network serves several different

(Continued on Page 40)

Dataspeed 40/4 Display Station

NEW YORK — A single display station arrangement of the Dataspeed 40/4, designed for interactive communications has been introduced by AT&T.

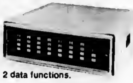
The single display station is suited for remote or branch office locations requiring only a single keyboard display and printer. The keyboard display with integrated controller is designed for private-line systems using binary synchronous protocol, AT&T said.

The desktop Dataspeed 40/4 keyboard display includes two 1,920-char. buffers — one for the display and the other to accommodate an optional printer. The two buffers permit a message to be prepared on the display while a second message is being received on the printer. The printer is available for local printing under operator control as well as remotely from a computer, Bell siad.

The terminal includes includes options for Ascii or Ebcdic code, monocase or upper/lower character set, alarm, field blink and station addresses.

Customer applications for the single display station include the insurance, manufacturing and brokerage businesses, AT&T said.

It is expected that the first tariffs for the Dataspeed 40/4 single display station will be filed in some states in the first quarter of 1978. Monthly rate will range from $170 to $200/mo, an AT&T spokesman said.



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Teletype 43 Friction-Fed

SKOKIE, Ill. — Teletype Corp. has added a friction feed version of its 30 char./sec Model 43 matrix teleprinter.

The send-receive terminal prints at 10 char./in. on a 72- or 80-char. line and provides an original and one copy.

It retains the same basic features of its pin-feed predecessor including upper/lower printing and 10 or 30 char./sec operation.

The Model 43 friction-feed teleprinter with an EIA interface lists at $1,396. A receive-only model costs $1,253. Delivery will begin in the second quarter of 1978, Teletype said from 5555 Touhy Ave., Skokie, Ill. 60076.

Sanders Software Speeds Graphic 7 Tasks

NASHUA, N.H. — A software program that automates the necessary functions within the Sanders Graphic 7 interactive display system was introduced by Sanders Associates, Inc.

The software/firmware package, called GSS-4 (Graphic Support Software), turns the Graphic 7 into a ready-to-use system that requires no user knowledge of the terminal itself. It allows anyone familiar with Fortran to create, generate and manipulate simple or complex images on the display screen using a variety of input devices, the firm said.

GSS-4 distributes the processing tasks between the terminal and the host computer. Approximately 75% resides in firmware in the Graphic 7 read-only memory. The other portion, a small software package written in Fortran IV, resides in the host computer. Virtually all minis and any other Fortran-oriented CPU can use the GSS-4 package, a spokesman said.

GSS-4 lets a programmer communicate in user coordinates via Fortran subroutine calls rather than display coordinates. Because GSS-4 enables the Graphic 7 controller to generate images, manage the refresh file, etc., it offloads the central processor for other applications tasks, the firm said.

Subroutines Provided

GSS-4 provides approximately 50 subroutines, including such graphic functions as text, vectors, points, circles, lightpen, cursor, keyboard, scaling, windowing, scissoring, clipping, rotation and smoothing. The package also responds to operator devices such as keyboards, lightpens, and cursor control.

The GSS-4 is priced at $1,000 — a one-time charge for documentation — plus $2,500 for the Graphic 7 terminal firmware card.

Sanders Associates, Inc. is at Daniel Webster Highway South, Nashua, N.H. 03061.

SNA Designed For Flexibility

(Continued from Page 39)

and interactive processing jobs. This was previously not possible with IBM systems, Fusco said.

The data stream is aimed at controlling the data representation used betweenapplication programs and devices. The number of methods by which data and control information are formatted is kept to a minimum, while at the same time allowing extension to accommodate a wide variety of application requirements, he said.

In general, SNA relieves the user of many network management concerns and it is no longer necessary that users completely understand the increasingly complex information systems that assist them in their work, Fusco told the attendees.

Avis Planning Wizard Upgrade

(Continued from Page 39)

functions including reservations, transactions such as renting and returning cars, fleet inventory, station inquiry and administrative transactions.

Avis selected a 1,200 bit/sec terminal speed because of ease of maintenance, less costly modems and low line contention, Kohler said.

Multiplexers in Place

Where possible, Avis installed hard-wired multiplexers instead of concentrators. Private lines are used running at 4,800- and 7,200 bit/sec.

The reservations center in Tulsa has over 100 Wats trunks, all controlled by a Collins automatic call director. The center handles over 20,000 reservations a day, and the 200 terminals there are multidropped, he added.

Behind the terminals is a 1M-byte IBM 360/65 and a second machine for backup. Each has a Modular Computer Corp. 128K, four-port memory front end with its own fixed-head disk. These cycle steal on the 360, he said.

Non-Standard Ascii

Avis uses Ascii code, but the line protocol is not standard, because tradeoffs had to be made with the hard-wired terminal, Kohler indicated.

The Wizard terminals, instituted in 1969, were the precursor of intelligent terminals and, although hard-wired, can be downline loaded to accommodate the 112 transactions, which each have their own sequence of data collection.

Kohler said the network may lose one concentrator a month. There can be six to seven line failures a day, which can mean up to 18 terminals out of commission for up to four hours, he said.

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With Printers, Cash Drawers

Mini-CRTs in Showrooms Do POS, Inventory

BETHESDA, Md. — A Maryland systems house has found a new use for the miniature CRT computer terminal. Interfaced with small printers and cash drawers in a chain of catalog showrooms, the system doubles as a point-of-sale terminal, desktop catalog and inventory updater.

Applied Systems Corp. has installed the system in W. Bell & Co. showrooms in the Washington, D.C. area. The system also supports showrooms in Atlanta, Houston and Baltimore.

"We chose the Informer Model 301 terminal which has a mini-CRT (6-in.) video display screen and a very compact keyboard," Nick Demos, project manager for Applied Systems, said. "The terminals sit out on jewelry counters or pickup counters and Informer's design is aesthetically very pleasing. Size is a consideration, too. We'd rather not take up counter space. And we didn't need the large-screen capability for this application."

Demos said Bell showroom salesclerks use the terminals as cash registers.

"When they're in a point-of-sale (POS) mode, they just enter the five-digit and one-letter catalog code. The computer comes back with the price and description of the product and displays it on the screen. Upon command the system calculates the sales tax and totals the transaction.

"The clerk then enters the method of payment, such as credit card, exchange voucher, charge or cash amount. The system writes on the printer attached so the customer gets a printed receipt," he explained.

Demos said the system installed by Applied Systems for the Bell showrooms also uses an inventory status mode where an item number is entered and the status and price are displayed on the screen. Showrooms may also crosscheck the inventory quantity in all other showrooms and warehouses.

Clerks can use the system to locate a substitution item when a particular product is out of stock, Demos said. By using the terminal in a different mode, vendor receipts are recorded. The inventory file is updated on-line and records are retained for sales analysis and other uses.

"The best part about the system is that it is totally interactive," Demos said, "That's a little different from the typical POS situation where everything is batched at the end of the day."

Applied Systems also developed a "remote concentrator" or controller in each showroom — actually a multiplexer — to enable showrooms around the country to use the host CPU, yet minimize the high cost of telephone circuits.

"Up to 16 Informer terminals with printers can be tied in to one concentrator," Demos said. "The Bell showrooms use from five to 16 terminals in each showroom. This way, all the terminals in a store can transmit over one circuit. The controllers share or "multidrop" on a telephone circuit so three circuits handle nine showrooms."

Bidirectional Printer From HP Controlled By 'Smart Algorithm'

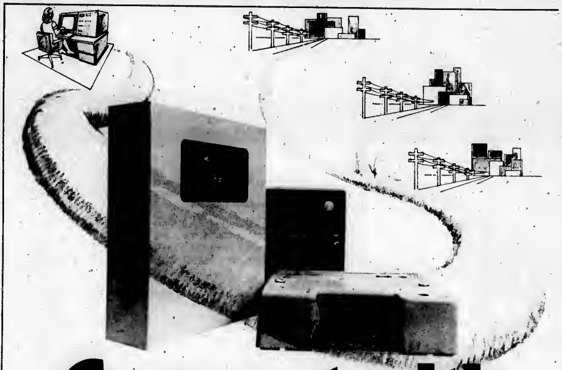
PALO ALTO, Calif. — A printing terminal which features a bidirectional printing path that reportedly is controlled by a "smart printing" algorithm has been introduced by Hewlett-Packard Co.

Terminal Transactions

Leading and trailing spaces on the terminal are detected and ignored, causing the head to move directly to the next material to be printed, HP said.

As the printer looks ahead in the data stream, it detects the spaces embedded within a line; when 10 or more spaces are found, the print head moves to the next printable character at a speed of 45 in./sec, according to a spokesman.

The price of the 2635A printing terminal is $3,450, HP said from 1507 Page Mill Road, Palo Alto, Calif. 94304.



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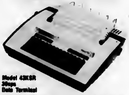

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EFT Device Guides User

BEDFORD, Mass. — Concord Computing Corp. has introduced the 770 transaction terminal, the second in a series of electronic funds transfer (EFT) terminals for users of NCR and IBM terminals.

The 770 is designed for customer entry of financial transactions at retail points-of-sale and bank branches to supplement NCR 279 and IBM 2260/2848 functions, according to a spokesman for the firm.

Self-Test Diagnostics

Some of the 770's features include prompting and transaction printing with a minimum of host CPU activity; and a self-test diagnostic mode to check all display lamps, the printer mechanism and the digital display, according to the spokesman.

It is equipped with a full alphanumeric printer, a 10-key keyboard, 12 transaction keys, 16 prompting messages, a magnetic stripe card reader and the microprocessor, Concord stated.

Concord's present design allows communications with a host CPU in either NCR Corp. 279 or IBM 2260/2848. protocols asynchronously at 1,200 bit/sec.

The financial terminal is priced between $2,150 and $2,450, Concord said from 7 Alfred Circle, Bedford, Mass. 01730.

DDP Capability Available For Basic/Four Model 400

IRVINE, Calif. — Users of Basic/-Four Corp. small business systems can now link their computers to each other or to larger, host mainframes to form distributed data processing (DDP) networks, according to a company spokesman.

Basic/Four recently equipped its Model 400 small business system with a bisynchronous communications capability with 2780 and 3780 compatibility, the spokesman said. The Model 400 system previously had only synchronous communications capability.

The newly available communications option also allows Model 400 systems to interact with any non-Basic/Four mainframe equipped with bisynchronous capability, the spokesman added.

To add DDP capability to a Model 400 already in the field, users need only install a bisynchronous communications board, expand their operating system by 4K to 5K bytes and write additional applications programs, the company said.

Basic/Four is aiming its distributed processing systems at first-time DDP users whose annual revenues range from $25 million to $250 million, the spokesman explained. In a distributed network, applications for the Model 400s include inventory control, accounts receivable and payable, payroll, general ledger and other standard accounting functions at manufacturing firms, wholesalers, hospitals and insurance companies.

A minimum Model 400 configuration with bisynchronous capability consists of one video display terminal, a 10M-byte disk unit and a 165 char./sec printer, the spokesman said. With a minimum main memory of 24K bytes, the systems cost $36,900 each or $24,000 in OEM quantities, the firm said. Basic/Four can be reached through P.O. Box C19550, Irvine, Calif. 92713.

Columbia Slates Network Topics

NEW YORK — A quantitative approach to data communication network design is the focus of "Computer-Communication Network Design and Analysis," a three-day seminar to be presented by Columbia University. It will be held Jan. 16-18 in New York City; March 13-15 in San Francisco and May 15-17 in Chicago.

The seminar is said to offer a practical exploration of network design aspects that are applicable to most computer and multipurpose data network.

The seminar leader is Dr. Mischa Schwartz, Professor of Electrical Engineering and Computer Science at Columbia University.

For registration information, contact the New York Management Center, 360 Lexington Ave., New York, N.Y. 10017.

Digicom Introduces Mini-Floppy Drive

SAN JOSE, Calif. — A microprocessor-based mini-floppy disk drive that emulates paper tape and magnetic tape has been introduced by Digicom Data Products, Inc.

The Digidisk system allows the operator to prepare and edit messages and data off-line and then transmit them through the optional built-in acoustic coupler. The unit will reportedly operate with any data communication printer or CRT terminal.

The Digidisk with RS-232 interface costs $1,199; with built-in 300 bit/sec originate-only coupler, $1,299; with a built-in 1,200 bit/sec 202-compatible coupler, $1,699.

Digicom Data Products, Inc. is at Suite 108, 1440 Koll Circle, San Jose, Calif. 95112.

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Storage Medium of Future?

Photoplate Disk Features High Density

By Frank Vaughan
CW Staff

PALO ALTO, Calif. — Magnetic storage and data processing are seemingly inseparable, yet if Jerome Drexler, president of Drexler Technology, has his way, the photoplate disk will be the storage medium of the future.

The Drexler photoplate disk stores data in the form of 1-micron dots (one millionth of a meter) in a homogeneous, dispersed emulsion of cubic silver halide crystals. Large glass sheets are coated with this emulsion, from which the disks are cut.

In the past; photographic disks had limited applications for data recording because recorded errors could not be detected until after the photoplate was processed. However, Drexler feels his technical staff has overcome this difficulty with a method which will permit the instant detection of recording errors, allowing corrections to be made before the photographic development of the recorded disk.

One of the main attractions of photoplate technology as a storage medium is the potential storage density, Drexler noted. By way of comparison, the data stored on 10 magnetic platters (each about 14 inches in diameter) of an IBM Corp. 3330 disk drive totals 100M bytes, he added. The same amount of data could be recorded with a laser on one 4-inch photoplate disk.

As another means of comparison, Drexler said that a single 12-inch photoplate disk would have the resolution to store 900M bytes of data.

In the system Drexler envisions, a read-only memory (ROM) photoplate disk can be used to store a CPU's operating system and a variety of assorted software programs. Multiple copies of the prerecorded "software disks" can be reproduced using inexpensive photogrpahic reproduction methods and can be distributed to users by vendors at a minimal cost.

Of primary interest to Drexler are the operating systems and associated software programs, which range from 25M bytes for small systems to the 800M bytes of a "supercomputer." For 800M bytes, he proposes an 11- or 12-in. diameter disk which would require a playback unit of about the same size as the commercial video disk players due to be on the market this spring. For the 25M-byte situation, Drexler proposes a mini-disk only 2 in. in diameter which could store and retrieve the data in a compact package, which could be tucked into a corner of a minicomputer package.

There are many potential user advantages to photoplate disk technology, Drexler noted. Since photoplate disks can be replicated by photographic means at low cost, the end user will see these savings passed on by the vendor. The publishing of many different programs on photoplate disks could lead to standard formatting and greater uniformity and efficiencies, he claimed.

Programs stored on photoplate disks are tamper-proof because the data is not erasable, and older programs can be saved without the problems and costs of annual regeneration, he said.

CPU availability is not lessened since the operating system can be read immediately and directly from the photoplate disk, he contended.

The introduction of errors by transferring data between magnetic tapes and disks are eliminated, he claimed, as are errors or data losses caused by electrical power disruptions.

Is photoplate technology going to be the software medium of the 1980s and 1990s? No one knows for sure, but Drexler is doing his part by offering his Romp photoplate disks to potential manufacturers of photo-optical computer memory systems in the hopes that they will become a way of life for users of the future.

Univac Offers Disk Subsystem For 1100, 90/80 Series CPUs

BLUE BELL, Pa. — When Univac recently announced several new systems [CW, Oct. 31], it also introduced a "Winchester"-style disk subsystem for both the 1100 and 90/80 series and a pair of special features for the 1100/80s.

The Univac 8450 disk subsystem is comparable in operation to IBM's 3340 subsystem. It uses sealed modules that include both a nonremovable read/write mechanism and multiple disks with recording surfaces.

In its maximum configuration, the 8450 is said to provide more than two billion bytes of on-line storage for 1100 series systems or 4.9 billion bytes for 90/80 users. The minimum setup, with a control unit and two drives, provides 672M bytes for the 90/80 or 134M words for the 1100/80.

Purchase cost of the minimum configuration is $66,000, while a gross lease cost is $1,616/mo under a five-year plan.

A fixed-head option, also available, would add $13,600 to the purchase cost or $224/mo to the lease cost, he noted.

The 110 special features include a Scientific Accelerator Module (SAM) scheduled for delivery in 1979, and a Subsystem Availability Module (SAU), expected sometime next year. SAM increases the speed of floating point and extended fixed point arithmetic instructions, the spokesman explained.

SAU enhances system resource availability by providing central control over the physical paths from peripheral subsystems to I/O units, he added.

SAM bcan be purchased for $124,235 or leased for $2,375/mo while SAU costs $79,360 or $1,675/mo under a lease plan.

Prices Lowered On TI 810 Printer

HOUSTON — A price reduction on the Model 810 microprocessor-controlled printer and the availability of international character sets was announced by Texas Instruments, Inc.

TI reduced list price of the printer from $2,250 to $1,895. The maintenance rates were also changed from $39.50/mo to $24/mo.

Lease rates were also reduced. The 90-day rate was changed from $165/mo to $145/mo. Rates for one- through four-year leases were reduced to $15/mo.

In addition, the firm released Katakana, Danish/Norwegian, Swedish/Finnish, German and UK character sets. Each full set (upper and lower case) is priced at $100, while the limited character set (upper case only) is priced at $50 from Texas Instruments, Inc. P.O. Box 1444, M/S 784, Houston, Texas 77001.

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SALES AND MAINTENANCE OFFICES THROUGHOUT THE US AND CANADA

System Compares, Correlates Energy Data . . .

ATLANTA — One of the nation's major electric utility systems is using a mainframe CPU to provide cost comparisons for total electric vs. split-energy systems in planning residential and commercial construction projects.

Southern Company Services, Inc. here provides technical and other specialized services to its parent firm, The Southern Co., and Southern Co.'s four electric utilities in the Southeast: Alabama Power, Georgia Power, Gulf Power and Mississippi Power.

If a Gulf Power sales engineer in Pensacola, Fla., asks for information to calculate power requirements for heating and cooling a new office tower, such factors as square footage, insulation, number of windows and similar variables planned for a building project are fed into Southern Services' Honeywell Information Systems Model 66/40 CPU in Atlanta. Data from similar construction projects is stored in memory. The system does its comparisons and correlations and in a matter of seconds provides architects and engineers with recommendations for achieving maximum economies in methods and materials.

Southern Company Services also uses its system for economic research and rate studies. Escalation of fuel costs and operating expenses has prompted a need for continual review of authorized rate structures, according to company officials. At the time a utility company files for rate adjustments, a complete analysis of costs and other financial data is essential.

Benefits of the system have surpassed the company's expectations, according to Charles A. Murdock, assistant data center director. The company spent a year and a half evaluating computer systems before choosing the 66/40 to take over its major time-sharing requirements.

Complex DP Center

The firm's data center has been described as one of the 10 most complex of its kind in the world. Used principally in accounting and engineering problem-solving assignments, the system occupies 18,000 sq-ft. of space and processes some 401,000 jobs annually. The data center employs 500 technical, clerical and administrative personnel.

HIS' $2 million entry into what had been exclusively "IBM territory" at Southern Company Services was in response to special requirements set forth by the service organization.

The company needed a computer "with great reliability and the capacity for smooth program conversion from the outside services then provided by General Electric (GE), according to Murdock.

"We needed program conversion with an absolute minimum of impact on our computer users," he explained.

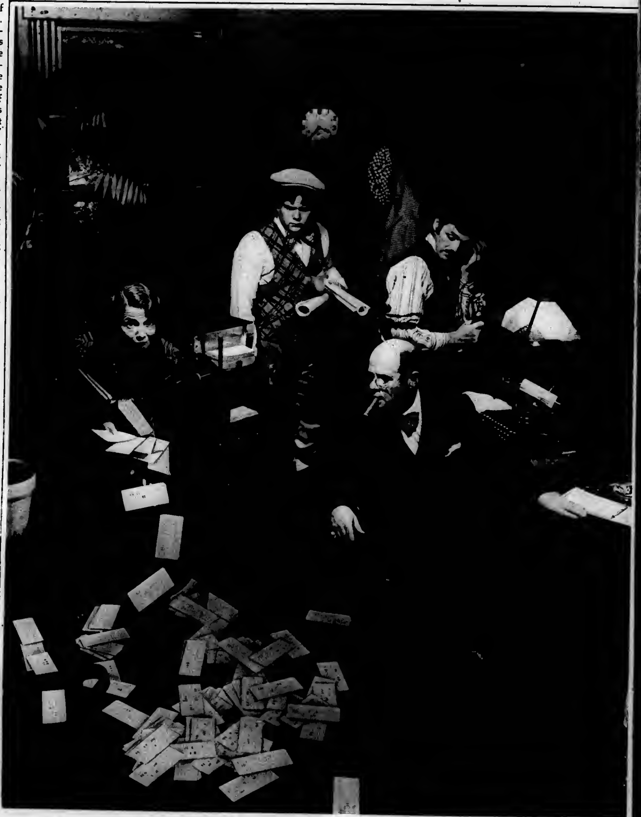
Centralized Operations

The company's data center, he added, centralized all computer operations in 1971, except for time-sharing problem-solving (what Southern Company Services calls interactive services) which GE, primarily, was providing. One attempt at "bringing the outside services in-house" was the installation of IBM's TSO system, but Murdock said "insufficient computer capacity and incompatibility with certain problem-solving aspects of the GE system" prompted Southern to explore other systems.

"During conversion to a new system, we knew it would be vital to continue day-to-day problem-solving services that our users expected and at the same time preclude the imposition of a high learning curve to the users' understanding of the new system," Murdock said.

Southern Company Services officials traveled to several

(Continued on Page 45)



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(Continued from Page 44)

locations in North America to examine a number of different systems. Among them were HIS installations at Bell Telephone of Canada, General Motors and Chesapeake & Potomac Telephone. At these three stops, Murdock noted, Southern Company Services found "overwhelming system reliability."

"An independent consultant confirmed our own findings," he said. "The Level 66 is a very cost-effective system."

Fall Installation

With a go-ahead from Southern Company Services, in the fall of 1974 HIS installed a computer at its Atlanta marketing headquarters to permit the company to conduct a second phase of its feasibility study. The CPU was linked to selected Southern users, who employed its services alternately with those of the General Electric system.

Satisfied with the demonstration, Southern Company Services contracted for third-party lease of the Model 66/40, and installation began at the data center in August, 1975. The agreement with HIS stipulated that program conversion be completed by Nov. 1. During the three-month period that ensued, 3,700 programs and 4,000 files were connected from the GE system to the 66/40.

System Links

The system is used to support problem-solving throughout the four-state southern electric system. Presently, it is linked with 58 terminals, and it handles time-sharing work for more than 400 users. In addition to remote system users, a small nucleus of Southern personnel located at the parent company headquarters is linked to it.

Departmental and system users include civil and distribution engineering, rates, economic research, environmental, sales, communications, planning, budgeting and statistical and financial services departments. To date, the computer has served a monthly peak of 25 concurrent users.

65% Savings

Murdock cited economic savings "in incremental costs" of more than 65% compared with costs of equivalent services provided previously by the GE system (incremental costs of less than $50,000 with HIS compared to $160,000 with GE).

"This financial consideration," he noted, "was a prime motivator in our original decision to convert from the outside services."

93% Replacement

Southern's objective is to replace all but 7% of the external time-sharing services with an in-house system, he said.

As for future applications, company officials explained that "a seven-year plan will develop the full potential of the system." Special developmental areas lie in financial, budgeting and marketing services. Word-processing, text editing and "interactive graphics" (engineering and structural design services) were cited as specific areas of interest.

Future Expansion

Southern Company Services officials foresee an expansion in the number of terminals to member company users. Beyond general office points now served at Birmingham, Pensacola, Gulfport (Miss.) and Atlanta, divisional and district office points in such places as Athens, Columbus, Macon and Rome, Ga., and in Alabaster, Ala., will be served. Up to 300 terminal points are in the long-range forecast.

The system currently includes 256K words of main memory, 10 disk drives, three tape drives, 1,050 card/min reader and a 1,200-line/min printer.

BASF invented magnetic tape back when IBM's growth was still in the cards.

Back in 1932, when Ronald Colman starred in *Arrowsmith* and a pound of sirloin cost 29 cents, BASF invented magnetic tape . . . the forerunner of all of today's high-density data processing media. The state of the art has progressed immensely since then, and we do have some well-known competition. That's why, at BASF, being first has to take a back seat to being best. And we've spared no effort to be the best. Over 1,500 scientists and engineers are involved in the BASF corporate research and development program, which operates with an annual budget of $200 million. The results of this effort can be seen in the performance of all BASF magnetic products. At BASF we realize that it's not how long we've been around that makes the difference; it's what we've done with our time. Ask our customers . . . most people who choose BASF make it their only choice. BASF Systems, Bedford, Massachusetts 01730.

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Groff Outlines Procedure

Vendor Choice Called Complex for Data Entry

By Frank Vaughan
CW Staff

NEW YORK — The subject of vendor evaluation is as complex and controversial as any other subject in the data entry profession, according to a workshop leader at the first annual Data Entry Management Conference, held here recently.

Requirements fall into two categories: absolute — those requirements that the user must achieve; and desirable — those requirements that, in addition to the absolute, would be utilized, according to Thomas E. Groff, director of systems and data for Pratt & Lambert, Inc. of Buffalo.

The budget for a specific subject also falls into two categories, the dollar budget and the time budget, Groff said.

The dollar budget is where the worth of the project is established as it relates to the dollar investment the user can afford to make. The time budget does not pertain to the span allocated for project completion, but rather to the time spent pursuing the vendor, he said.

Managers must determine the critical value of the project because if what the manager intends to accomplish can have a dire effect on corporate stability, then vendor performance becomes critical, Groff pointed out.

The manager should look and reconsider his own in-house facilities. Possibly something can be added to accomplish the goal well within the budget. If not, selection of prospective vendors should begin, he said.

Groff suggested users maintain a file of literature received from vendor visits and not try to bar the door to vendors.

If he can, the manager should subscribe to a DP hardware/software updating service, he said, noting the manager should research all reference material at his command to finally select those vendors whose facilities appear to fit the user's requirements.

Finally, Groff recommended, inform the selected vendors not only that they are in contention, but against whom they are competing.

Financial Report

The next step, according to Groff, should be to solicit a financial report or Dunn and Bradstreet report on the vendors to ensure they will be on the scene in the upcoming year.

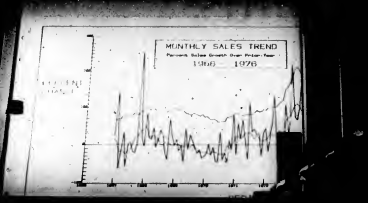
Obtaining blank copies of contracts and warranties from the vendors is another means the manager can use to evaluate vendors, the session leader noted.

Request a list of vendor customers in your area and don't be afraid to visit these other users, Groff told the workshop attendees, but he cautioned, the manager must be sure that he is the one who selects the customer from the vendor's list and that he contacts several customers if possible.

When the time comes to consider requesting bids, the vendor field should be narrowed down. Each vendor selected should be provided with a request for quote.

The manager can then review the quotes, making sure that the vendors have quoted in accordance with the request, and that the quotes and the contracts are compatible. Then the manager can select the vendor and place the order, Groff said.

From only 90 seconds of transmission time, HP's new graphic plotter drew this chart in four colors, picked up its pens, and put them away.



Neat, isn't it.

Getting this kind of graphics from complex computer data has always been a long drawn-out problem. Now, arcs, circles, dashes, dots, and alphanumerics—routine shapes that normally take lengthy programs—are quickly drawn by single commands.

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DEC Packages, Cuts Price Of Six PDP-11 Systems

MAYNARD, Mass. — Digital Equipment Corp. has packaged eight of its systems into standard configurations which the firm said it is offering at price reductions of 8% to 21%.

Products affected by the price cut were the PDP-11/70, 11/60, 11/34A, 11/34, 11/04 and the 11/03.

The PDP-11/70 CPU with RP06, 176M bytes of disk storage, TE16 magnetic tape load device, 256K bytes of core memory and choice of four operating systems has been reduced 14% to 20%.

The price of the PDP-11/60 with dual 14M-byte RK06 disks for storage and load, 128K bytes of MOS memory and choice of five operating systems has been cut 8% to 10%.

The PDP-11/60 with a 5M-byte RK05F fixed media disk and 2.5M-byte RK05J removable media disk, 64K bytes of MOS memory and choice of five operating systems can be purchased for 8% to 13% less than before.

The PDP-11/34A with dual RK06 disks, 96K bytes of MOS memory and choice of four operating systems was reduced 8% to 15%.

The price of the PDP-11/34 with RK05F and RK05J disks, 64K bytes of MOS memory and choice of four operating systems has been cut by 17% to 21%.

The PDP-11/04 with RK05F and RK05J disks, 64K bytes of MOS memory and choice of two operating systems is offered at a savings of 19% to 20%, while the PDP-11/03 with RK05F and RK05J disks, 32K bytes of MOS memory and RT-11 operating system has been reduced by 16.7%.

The PDP-11/03 with dual RX01 floppy disks, 32K bytes of MOS memory and RT-11 operating system now costs 18% less than it did previously.

Cabinet Holds Tape Cartridges For IBM 5100, 3M Drives

NEW YORK — A cabinet for storing and retrieving 1/4-in. tape cartridges used with IBM 5100, 3M and other drives has been announced by Printcraft Systems, Inc.

The unit is self-stacking and interlocking in design. Each drawer has adjustable dividers and follow blocks, with a storage capacity for 72 cartridges.

A one-drawer unit costs $85, the two-drawer model costs $125, and the lock and key costs $12 from Printcraft at 11-17 Beach St., New York, N.Y. 10013.

Multiprocessors Suggested For Users With Big Loads

Esther Surden
CW Staff

CUPERTINO, Calif. — Users with a large transaction processing load and the need for a system that is reliable have a limited number of options. Typically, such a user can contract with a systems house to design a multiple processor configuration using standard minicomputer hardware.

Another alternative is turning to a firm specializing in supplying such a system. Going to a vendor who specializes in multiprocessor systems has two advantages, according to Sam Wiegand, vice-president of marketing for Tandem Computers, Inc. here, maker of the nonstop multiprocessor system.

First, the user gets a standard product, not one that must be specially configured each time, and benefits from not having to worry about initial system development, Wiegand said. Secondly, users can take advantage of already developed runtime software for their systems.

Tandem's systems range in cost from about $100,000 to $1 million. They are configured from common modules and differ only in the number of processors, controllers and other devices used in the systems.

The systems can be expanded at the user's site without even shutting the systems down for critical applications, Wiegand noted. To do so, the user must have ordered the

(Continued on Page 52)

System/4 Handles Card Reader

By Jeffry Beeler
CW Staff

NEW YORK — Univac's BC-7 small business system was reintroduced in modified form by Decision Data Computer Corp. (DDCC) at Info '77 here recently.

In most respects, the System/4 and the BC-7, which were originally designed by the two firms in a joint development project, are nearly identical twins, according to John Puchon, Decision Data's System/4 director.

The Decision Data system, however, was designed to accommodate card readers like its own 9610 Interpreting Data Recorder and printers as fast 600 line/min, while its Univac counterpart lacks this card-handling capability and can operate with printers no faster than 250 line/min, Puchon said.

This difference in peripherals makes the System/4 suitable for first-time users of disk-based systems and for IBM System/3 users who would otherwise upgrade to an IBM System/34 but can't because of that computer's inability to accommodate card readers, he said.

A minimum System/4 configuration consists of a CPU with 48K bytes of main memory expandable in 16K-byte increments, a 2M-byte diskette unit, one workstation and a 120 char./sec bidirectional printer.

The system can be expanded to incorporate a 300- or 600 line/min printer, multiple workstations, a 30M-byte disk unit and a 96-column data recorder, according to the firm.

The computer's System Control Language uses two applications languages — RPG-II, which Puchon said "is more than 99% compatible with IBM," and Ideal, a data base management language that reportedly executes commands with simple English verbs.

(Continued on Page 49)

User Overloads, Not Upgrades

CHICAGO — It's not often in this age of inexpensive minicomputer CPUs, cheaper memories and less costly disk drives that a company pushes its system to capacity. Usually the alternative of upgrading is much simpler.

The Dietzgen Corp., however, is using two small business systems to their limit, according to Bill Wheaton, vice-president of operations.

"Actually, we are not having as many problems as we anticipated," Wheaton said. The company purchased the two Basic/Four Corp. Model 400 minicomputers knowing that it was going to "give them quite a workout."

Basic/Four was "reluctant to sell them to us in the beginning." Dietzgen "overloaded deliberately at the time we installed the systems."

Overloading is working well, Wheaton reported. The two systems are being used in an on-line, real-time teleprocessing application. Located at the Chicago headquarters of the firm, the systems are connected via telephone lines to CRT terminals and printers at six remote warehouse/manufacturing locations. The systems supplement the activities of an IBM 360/30 batch-oriented

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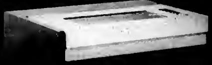

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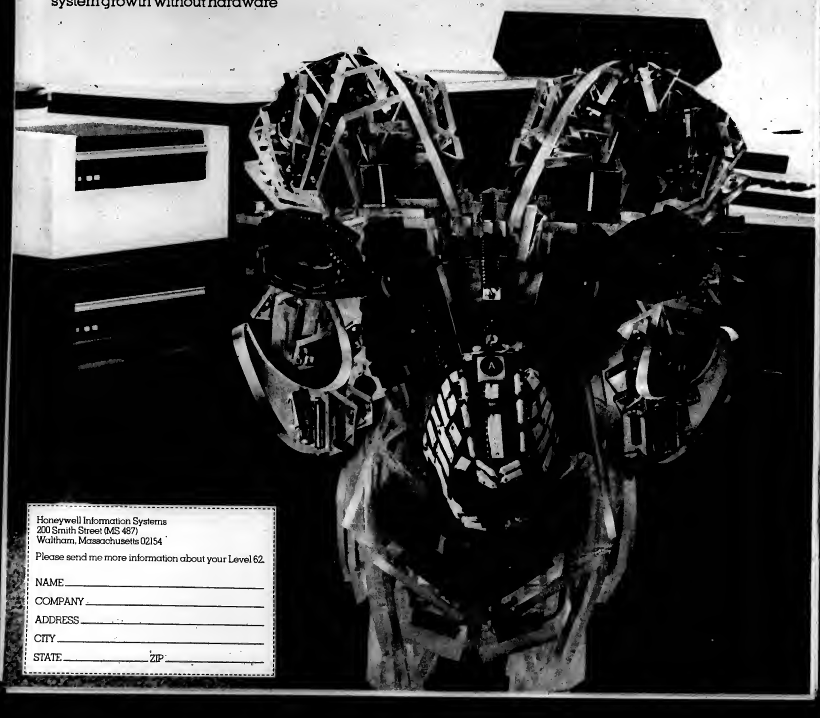

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User Deliberately Decides to Overload Systems

(Continued from Page 47)

system, also located in Chicago.

Dietzgen purchased the systems to achieve more efficient order entry, inventory control and better customer service, Wheaton noted. The systems have done this and also paid for themselves in the first nine months of operation, allowed a 25% reduction in inventory levels in the first year and resulted in a manpower savings of 12 people, according to the vice-president.

When originally considering the need to perform these applications, Dietzgen thought about upgrading the IBM 360/30 to a larger IBM system, but "it was just not economically feasible," Wheaton recalled. The type of system offered as an upgrade was not compatible to the firm's on-line processing needs, he explained.

So the company surveyed the mini area and examined seven alternatives. "Basic/Four had the least expensive system that provided us with a whole package," Wheaton said, and had already installed operations performing the same applications so "we could see what could be done" with the system.

Dietzgen manufactures products ranging from slide rules to microfilm cameras and has 3,500 items in stock.

The central systems communicate in real time with the six remote locations; portions of the data sent to the CPUs are selected for further processing by the 360/30 system

Before the systems were installed almost two years ago, Dietzgen was primarily using NCR billing machines at the manufacturing/warehouse locations for the order entry and billing functions. These machines produced hard copies of the orders, which were then sent to Chicago and rekeypunched there to be entered into the central system.

There were errors introduced during the keypunching operation, and when the company eliminated the operation it saved the expense of three keypunchers. It also saved time by transmitting data by wire instead of mailing hard copies and having to input that material a second time, a spokesman noted.

As a result, the company has reduced its delay in closing sales from the middle of the month to about two days after month's end — an elimination of about 12 days delay in closing.

Total cost of the systems, including terminals and printers at the six remote locations, was approximately $200,000.

Hardware located at Chicago headquarters includes two CPUs, each with 64K memory and dual disk drives; two medium-speed printers; and three CRTs.

System/4 Bows; Handles Cards

(Continued from Page 47)

Predefined procedures can be on a disk menu, which lists all the system's applications programs like order entry, general ledger and inventory control together with their respective functions, Puchon explained.

The System/4's CPU incorporates two processors — an 8-bit parallel binary control processor and a microprogrammed Interpretive Macro Processor (IMP), Decision Data said.

The control processor uses an Intel Corp. 8080 microprocessor with an 8-bit accumulator, six 8-bit programmable work/index registers and an 8-bit external data path, Puchon explained. It can execute instructions in 2- to 9 msec; with a 16-bit address bus it can directly address up to 64K memory locations, the firm added.

The IMP also directly addresses up to 64K locations and incorporates an Intel 3000 series microprocessor to execute macro-level operations generated by the system's RPG-II compiler and other software facilities, Decision Data added.

Besides the two microprocessors in the CPU, a minimum System/4 configuration incorporates one microprocessor in the workstation controller, one microprocessor in the workstation itself and a fifth device in the diskette controller, Puchon said.

The configuration's system bus can transfer information in and out of main memory at up to 1M byte/sec and can operate at up to 400 byte/sec with little control processor slowdown, Decision Data said.

The bus interfaces to peripheral controllers through a direct memory access (DMA) facility which consists of a disk controller, Microcoded Communications Line Adapter (MCLA) and a shared DMA controller (SDMAC) the company added. The MCLA is used when two System/4s are linked by communications lines or when one system communicates to a host mainframe, Puchon said.

Because it emulates IBM 2780 and 3780 as well as Univac DCT 2000 protocols, the system communicates with IBM 360s and 370s and with most Univac computers, the System/4 director added.

The SDMAC, meanwhile, interfaces low- and medium-speed peripherals like workstations and printers to the system bus, according to the company.

Puchon credited the DMA with needing only a 2- to 3-byte buffer to prevent bus underruns or overruns.

A minimum System/4 configuration with a 48K-byte main memory costs $22,400 from the firm at 100 Witmer Road, Horsham, Pa. 19044.

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Minis Fill Dutch Wholesaler's Real-Time Needs

AMSTERDAM, The Netherlands — Self-service wholesale organizations have two major requirements that lend themselves to using minicomputers: one is to provide their customers with completed invoices at the check-out counters; the other is to keep an accurate daily inventory of all stocked products.

Makro, the Dutch international self-service wholesaler, chose minis for its 27 outlets in The Netherlands, the UK, Belgium, Spain, South Africa and South America.

Since the early 1970s a DP and transmission system based on Hewlett-Packard 2100 minicomputers, linked off-line to IBM central processors in each country of operation, has helped the company keep track of changing prices and other business parameters.

"The investment in the computing systems has undoubtedly been a major factor in helping the company grow to its present position," one manager said.

The firm is now investing an additional $6 million in its DP system by replacing the 21 minis located in four countries with more powerful HP 3000 Series II business systems.

This latest change will bring about a further requirement for less maintenance and the capability to connect a larger number of invoicing terminals, according to the spokesman.

In addition, the systems will allow continued operation on all terminals in case of system breakdown.

The firm selected the equipment because it fulfilled several performance requirements including speed, easy access to management data and protection in case of system failure.

Real-Time Invoicing

Invoices had to be completed in real time at up to 38 point-of-sale terminals while customers were still at the check-out counters. Speed, therefore, was a prerequisite since a slower system causes queues to build up.

Individual stores also needed management information for use by store managers, and certain management data had to be transmitted from each store to one of the firm's national centers for further processing.

The system had to have some protection against failure of the computer hardware and it had to be capable of being used in all the company's outlets — so international standardization was required.

Every store has a "main" and a "backup" system, but each system is capable of handling all check-out terminals. In the event of a failure, invoicing can continue on the backup system with the use of a logging tape.

Each store will have two HP 3000 Series II computer systems, each with 192K bytes of memory, four 15M-byte HP 7905 disk drives, three HP 7970 magnetic tape drives and up to 38 point-of-sale terminals. The terminals include an invoice printer, a data-entry keyboard and a numeric display.

In operation, the check-out operator keys in the code number of the customer, then the computer retrieves the full name and address of the customer from the file and prints it on the invoice. The code of each article bought is also keyed in and the computer provides a detailed invoice.

Along with the handling of all check-out terminals, the systems concurrently perform several other functions. One is to track outstanding orders, goods received, price changes and other information, enabling Makro management to base its financial and management decisions on complete and recent data.

At the end of the day, this information is either processed locally on the 3000 or transmitted via telephone lines to a national data center where data is processed further on a mainframe computer.

This feature allows the staff at headquarters in the respective countries to watch local buying trends, enabling them to keep pace with demands.

"The most significant feature of the system is perhaps its ability to provide in the evening needed information to assess profits on the same day's trading," one manager said.

Each store's system includes a console from which management can access information held on the disk, including data on product-line trends.

The company is also exploring the possibility of using the systems for services not previously available, including sales-tax calculations and development of customer-screening procedures.

The firm's customer list includes merchants, small shopkeepers, hotels and catering establishments. Each store stocks about 35,000 products.

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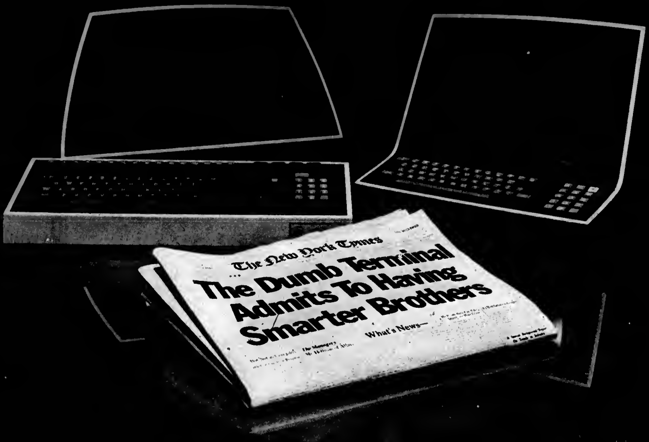

The New York Times
The Dumb Terminal Admits To Having Smarter Brothers
What's News—

Mini Users Seen Getting More for Less

By Esther Surden
CW Staff

NEW YORK — "Backwards" technology provides more capability more cheaply for users of minicomputer systems, Rowland H. Thomas, vice-president of Data General Corp., told a recent American Institute of Industrial Engineers conference here.

The technology is backwards, he said, in the sense that more capabilities usually go hand in hand with higher price tags.

Microprogramming, for example, is the basis of most current minicomputer architecture and gives manufacturers maximum design freedom to expand their early general-purpose instruction sets.

"These vendors are now adding machine instructions that were too complex and elaborate to implement with hard-wired logic. Microcoded instructions handle such things as vectoring, string manipulation and character operation in one CPU.cycle," he stated.

A few mini makers offer writable control store so that users can define and implement their own instruction set, he added.

There is also a trend toward greater and greater memory capacity and memory speeds are increasing to 800 nsec. "Newer memories are based on semiconductor technology because it's becoming faster and cheaper than core," Thomas said. Looming on the horizon for auxiliary memory storage are bubble memories, charge-coupled devices and rotating memory with thin film heads that can store 10 million bits per square inch, he noted.

Advances in peripherals are also providing more for less, he added, but software developments are perhaps the most important ones for users.

"In may cases, the breadth of minicomputer software is equivalent to that of mainframe systems," he asserted.

"The new generation of multiprogramming systems supports timesharing, batch and real-time operations concurrently," he pointed out.

"The list of business-oriented languages available is now as long as that of standard scientific languages."

"Sophisticated optimizing techniques are coming along to make these languages more memory-efficient and execute faster," he added.

Finally, communications software is also coming of age, Thomas said.

Multiprocessors Urged for Large Loads

Continued from Page 47)

capability when he first installed the system. That way the system treats the unadded portion as "dead" until it is added.

If that capability has not been added, then reconfiguring may take several hours.

Tandem is not alone in offering users multiple configuration systems, Wiegand noted, but it is the only company that has designed a whole system around the concept. The system suits users across industry and applications boundaries, he noted. The only requirement is that the user be somewhat sophisticated and have an application in which on-line interactive system reliability and data integrity are important.

Typical users appear in the banking, credit, retailing, manufacturing, wholesale distribution, communications, medical and publishing businesses. Actually, any user with an application that has a throughput requirement of 10 or 20 transaction/sec can use the system.

It also can acommodate workloads up in the 50 transaction/sec range, Wiegand said. That is beyond the range of most minis, he noted, and even beyond the range of many mainframes.

File Technique

Fast throughput on the system is a result of a file usage technique in which a single file is spread among several processors; this balances out the reads and writes among the files, upgrading transaction processing performance significantly, he explained.

The programmer can access any file from any of the processors without having to "change a line of code," he added.

The Tandem system has several features that sets it apart from the rest of the small system field, Wiegand said. The data communications option and data base management system are implemented at the driver level, the lowest level of the operating system. Many other minis put these features on top of the system software, creating a lot of overhead and slowing the operating system down, he said.

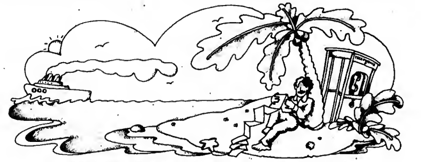
Reliability is the system's primary user-oriented feature, Wiegand stated. If a component fails, the CPU console is notified about which part is down. The system continues to operate despite the failure because the remaining components automatically take over.

Interface Unit Fits DG Novas, Eclipses

WHEATON, Md. — The Ray Bushnell, Inc. Model 417 bidirectional interface module is a device that allows Data General Corp. users to interface with instrumentation devices.

The IEEE standard unit occupies on I/O slot in a DG system, its vendor said.

Furnished with all the necessary software and cable, the unit costs $2,100 from the company at 13123 Valleywood Drive, Wheaton, Md. 20906.



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Micro Bytes

Digital Printers Feature Dot Matrix Print Head

CHATSWORTH, Calif. — Anadex Corp. has introduced the DP-1000 series of digital printers, featuring a dot matrix impact printing element capable of printing 64 alphanumeric and special symbols in 40 char./line at 1.25 line/sec.

Three basic Ascii configurations allow interfacing to most minicomputers, modems and the current-drive mode of Teletype Corp. printers. Single- or double-width characters may be selected via an external control line, allowing either 6 or 12 char./in. to be intermixed on a line.

Prices for the DP-1000 series start at under $700, Anadex said from 9825 DeSoto Ave., Chatsworth, Calif. 91311.

Word Processing System Runs Under Mits Basic

OWINGS MILLS, Md. — Interactive Data Systems here has developed a word processing system, Idsword1, designed to run under Mits Co. Disk Extended Basic.

Features of the system include line editing — for inserting, deleting or changing text in a line of data; global editing — for inserting, deleting, changing or finding strings of data in a selected block of text; reformatting — which moves words between lines for maximum line size; and merging — which combines portions of various files into a single file, a spokesman said.

In addition, text can be printed with optional page numbering and right justification. Multiple copies of form letters can be produced from name and address files, the spokesman added.

Idsword1 consists of several programs and, although transparent to the user, requires 28K of memory. The package costs $250 and includes documentation and the program diskette. Interactive Data Systems can be reached through P.O. Box 290, Owings Mills, Md. 21117.

Data Base Program Offered

BLACKSBURG, Va. — A data base program that can be used with microcomputers that use the Basic language has been announced here by Physical Biological Sciences, Ltd.

Outlined in a book called *People's Data Base System,"* this program can be understood by nonprogrammers since it requires only familiarity with command calls, according to a spokesman.

The volume is available for $14.95 from Physical Biological Sciences, Ltd., Box 47, Blacksburg, Va. 24060.

PCM-12 Gets Dual Floppy Disk Interface Module

SAN RAMON, Calif. — Pacific Cyber/-Metrix, Inc. (PC/M) now offers a dual floppy-disk interface module for its 12-bit microcomputer, the PCM-12.

PC/M's 12440 module will reportedly allow PCM-12 users to execute all Digital Equipment Corp. PDP-8 diagnostics when used to interface the PCM-12 to Data Systems Design's Model 210 floppy-disk memory system. This device also makes the PCM-12 system fully compatible with mass storage operating systems already developed for the PDP-8 family of minicomputers, a spokesman added.

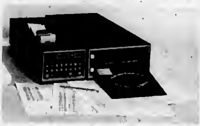
The unit sells for $259 assembled and $169 in kit form from Pacific Cyber/Metrix, Inc., 3120 Crow Canyon Road, San Ramon, Calif. 94583.

For 8080, 8085

System Supports BSAL

SUNNYVALE, Calif. — A multiuser/-multitask development system for use with the 8080 and 8085 microprocessors was unveiled by Mupro, Inc.

The system, composed of the Mupro-80 microcomputer and 80D dual floppy diskette drive, features the Mute software package. This package supports Block Structured Assembly Languages (BSAL) as well as mnemonic assemblers. BSAL has a high-level syntax, intuitive statement formats, self documentation and cross-reference tables, according to the firm. The 80D diskette system is IBM 3740-compatible and controlled by a card.



Mupro's 8080/8085 software development system costs $9,000.

The disk controller accommodates up to two dual-disk drive units, contains a programmable real-time clock, and supports disk data transfers via direct memory access, a spokesman said. The floppy disk drive is voice-coil actuated with an average seek time of reportedly less than 50 msec.

This system package also accommodates options such as real-time in-circuit emulation and on-line programmable read-only memory (Prom) to satisfy the hardware/-software design, production and field service requirements, the company said.

The Mupro-80 microcomputer and Mupro-80D dual floppy diskette system with Mute and all related software, is priced at $9,000 from Murpo, Inc., 424 Oakmead Pkwy., Sunnyvale, Calif. 94086.

Development Lab Debuts

BEAVERTON, Ore. — A development lab that provides in-prototype emulation for 8- and 16-bit microprocessors has been introduced by Tektronix, Inc.

The 8001 is designed for the developer of microprocessor-based systems who already has access to software development capabilities, but requires a test bed for hardware checkout and integration of software and hardware, the firm said.

Programs developed on external stand-alone or time-shared systems can reportedly be downloaded to the 8001 via an RS-232C source. Then, the user's program can be run in emulation mode. A control probe is then connected between the 8001 and the prototype.

When a transfer of memory blocks begins, only good segments are turned over to the prototype with troublesome segments held back until the bugs are worked out.

The price of the 8001, which includes an emulation processor and prototype control cable, is $7,650 from Tektronix, Inc., P.O. Box 500, Beaverton, Ore. 97077.

Tektronix Development Lab

Prototyping Package Unveiled

SANTA CLARA, Calif. — A prototyping package that lets designers construct and debug custom interface systems was introduced by the National Semiconductor Corp.

The BLC 80P package consists of an 80/10 computer board with 1K words of random-access memory (RAM) and 2K words of blank programmable read-only memory (Prom). It has 48 programmable parallel I/O lines that are socketed to accommodate interchangeable line drivers and terminators, the firm said. The package includes 10 DM 7437 open-collector line drivers, 10 BLC 902 1K-ohm terminating resistor networks, and 10 BLC 220/330-ohm terminating resistor networks.

To aid in developing customer interface circuits. BLC 80P contains a prototype board with space for 114 16-pin sockets.

National Semi has packaged the BLC 80P prototyping package.

The 6.25-in. by 12-in. MPU and prototype boards are housed in the BLC 604 card cage which reportedly accommodates two additional Series/80 boards. The BLC 80/10 has jumper-selected options for RS-232 or current-loop mode and cables are supplied for a CRT terminal and teletypewriter.

The BLC package, including hardware reference manual, users guide, and schematics costs $878 from the National Semiconductor Corp., 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

I/O Expansion Card Bows

SANTA CLARA, Calif. — An I/O expansion card, added to the Series/80 Board Level computer series, has been introduced here by the National Semiconductor Corp.

The board, which can transfer data at rates up to 1.3M-byte/part, connects to the system bus through the 86 pin card edge and has a 100 pin edge connector for parallel I/-O, said the firm. Data, address and control signals are transistor-transistor logic (TTL) compatible and it operates on +5vDC, according to a spokesman. The four output ports have a variable width strobe available for peripherals, which is set in a range from 100 to 1,600 nsec by a plug jumper.

The board, which can accept eight external interrupt requests, sells for $315 from National Semiconductor Corp., 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

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System Tests Applications

HIRAM, Ohio — A system designed for use in the development of programs to run on microcomputer systems and as a prototype for microcomputer applications has been introduced here by Ohio Scientific.

The Challenger III is equipped with three microprocessors and a triple-processor micro processing unit (MPU) board, making it ideal for education, small business and personal computing, the firm said.

Options include additional memory, line printers, CRT terminals, 1M-byte memory management, software processor switch, configuration for up to 16 users, video board and video programmable read-only memory and an additional parallel port.

With 32K of random-access memory, a serial interface, a dual drive floppy disk and software, Challenger III costs $3,481 from Ohio Scientific, 11681 Hayden St., Hiram, Ohio 44234.

Datel Has Tabletop Printer

CANTON, Mass. — A tabletop printer for microcomputer systems has been introduced by. Datel Systems, Inc.

The AIP-40 can print up to 40 columns on ordinary adding machine roll paper using a 5 by 7 dot matrix impact printer, said the firm.

Up to 64 Ascii-coded letters, numbers and special characters are accepted and printed at a rate of 50 char./sec, according to a spokesman.

Among the features offered as selectable modes are double-width characters for bold printing, parity detection, 10- or 11-bit teletypewriter characters, reverse field printing and automatic printing start for serial models if no data is received after 3 sec, he said.

The automatically reversing ink ribbon will reportedly print 100,000 lines. A 170-ft paper roll contains about 12,000 lines.

The AIP-40 including the housing, print mechanism, choice of power supply and interfece electronics costs $425 from Datel at 1020 Turnpike St., Canton, Mass. 02021.

Adapter Available

BROOKFIELD, Conn. — The Connecticut Microcomputer Corp. has introduced an adapter which reportedly makes it possible for a micro's teletypewriter port to be used to drive an RS-232 terminal, or vice versa, without modification of the port, according to the firm.

The adapter has two circuits, one to convert an RS-232 signal to a 20ma current-loop signal and a second to convert a 20ma current-loop signal to an RS-232 signal.

The adapter sells for $24.50 with drilled, plated-through solder pads for all connections or for $29.50 with barrier strips and screw terminals from the firm on Pocono Road, Brookfield, Conn. 06804.

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A

assembly language — Most microprocessor programs are written as a series of source statements using mnemonic symbols that assist in the definition of the instruction and are then translated into machine understandable object code, e.g. binery 0s and 1s.

asynchronous transmission — Refers to transmission in which each group of code elements corresponding to a character signal is preceded by a start signal which serves to prepare the receiving mechenism for the reception and registration of a character and is followed by a stop signal which serves to bring the receiving mechenism to rest.

auxiliary storage — A storage device in addition to the mein storage of a computer, e.g., magnetic tape, disk or megnetic drum. Auxiliary storage usually holds much lerger amounts of information than the mein storage, and the information is accessible less repidly.

B

background processing — The automatic execution of lower priority computer programs when higher priority programs are not using the system resources.

backplane, microcomputer — A typical bus-oriented backplane is used as the deta highway between logic memory and process input/output modules. Some beckplanes are configured so as to give each module plugged into it its own unique address. As a result of this "card address" design, users can interchange memory end input/-output modules throughout the chassis. One type backplane hes in each chassis three control slots, one terminator slot and 16 multipurpose addressebie slots. Since only three of the 16 are used in many basic systems, 13 slots are availeble for users to plug in any additional memory or interfacing required.

B address — The higher order position of the instruction code indicating the locetion of data to be processed.

balanced (to ground) — The state of impedance on a two-wire line when the impedance to ground as measured from one side of the line is equal to the impedance to ground as measured from the other side of the line.

Basic — Beginner's All-purpose Instruction Code. A common high-level time-sharing computer programming language. It is easily learned and used for direct communication between teletypewriter units and remotely located computer centers. The language is similer to Fortran II and was developed by Dartmouth College for e General Electric 225 computer system.

LEARNER'S LEXICON

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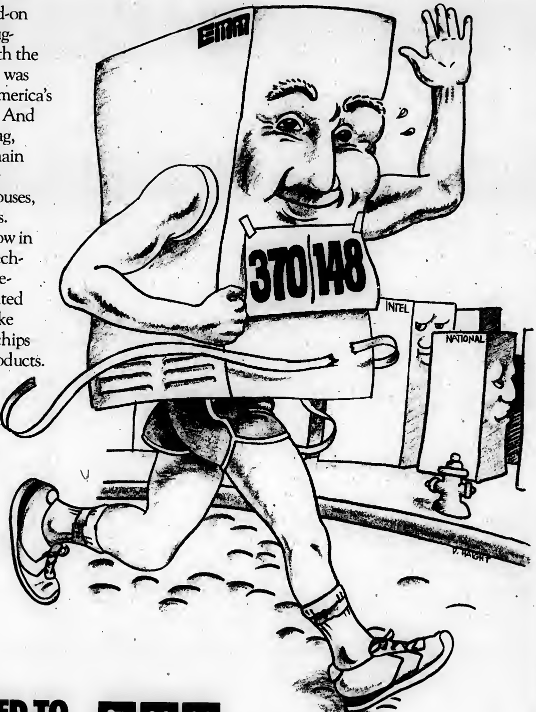

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Despite Strong Industry Growth

Charts Show IBM Outran Others in '60s

By Catherine Arnst
CW Staff

NEW YORK — Although the computer industry experienced a high growth rate of 25% during the 1960s, no firm ever came close to matching the size of IBM's installed base, according to Dr. Alan K. McAdams, the government's chief economic advisor for the U.S. vs. IBM antitrust case.

According to charts developed by McAdams and entered into evidence at the trial, IBM's share of the domestic installed base always hovered around the 70% line while the other firms studied were generally below 10%.

This trend is consistent in all of McAdams charts, although he used data from three different sources: IBM Competitive Statistics (Comstat) figures, which IBM gathered by having its salesmen contact users; International Data Corp. (IDC) statistics, which the market research firm gathered by contacting users directly; and government estimates based on a survey of manufacturers the Justice Department conducted for this case.

McAdams used Comstat computer system categories for all his charts, no matter what the source of data. These categories broke down systems by size, with categoreis A and B representing large scientific computers, G representing small business computer systems and C through F representing general-purpose systems, a market which IBM is alleged to monopolize.

When the installed base share of IBM and its competitors (Burroughs, Control Data Corp., Digital Equipment Corp., General Electric, Honeywell, NCR, RCA, Singer, Univac, Xerox and others) were derived for all the Comstat categories, IBM garnered 71.4%, Honeywell and Univac held 8.1% and 9.6% respectively and the rest of the firms ranged from 4.5% to .1% in 1972.

IDC, U.S. Figures Lower

IDC figures for the same categories showed IBM with 69.2% in 1972 while the other firms ranged from 9.1% to .5%. Government estimates gave IBM 69.5% with the other firms ranging from 10.5% to .1%.

Both IDC and Comstat figures included each firm's internally installed systems, whereas government estimates did not, resulting in government estimates that tended to understate market share, McAdams said.

In a companion set of charts, McAdams extracted the scientific and small business system categories from his calculations to demonstrate IBM's market share of the general-purpose installed base is higher than the overall installed base. The market shares of the other firms depicted in the charts either dropped or, in the case of Burroughs, rose only one percentage point in 1972.

IBM's share of the general-purpose market, according to McAdams' charts, has been greater than its share of the overall computer market since 1964, which is approximately the time it announced its 360 line of systems. The government has claimed that several of the 360 machines were anticompetitive, and McAdams used these charts to demonstrate what he believes is IBM's dominance over the general-purpose computer market.

The general-purpose market has experienced extremely rapid growth during the 1960s, McAdams said, and IBM has kept pace with that growth. When the value of installed base is measured in millions of dollars per month in rental IBM increased in size from $25,540,000 in 1960 to $330,923,000 in 1972, according to McAdams' calculations.

All the other firms measured also experienced this rapid rate of growth of 25% to 28%, he said. However, as with the percentage of installed base, no other firms came even close to IBM's earned rentals; Univac, the second largest on McAdams' charts, started out with $3,303,000 in 1960 and reached $49,879,000 by 1972.

These other firms rarely even came close to IBM's 1960 installed base throughout the 12-year period measured, according to the charts. CDC's installed base in 1972 equalled 60% of what IBM had in 1960, and Univac did not meet IBM's 1960 level until 1968. It was not until 1972 that Univac met the industry giant's 1961 level.

This rapid growth rate took place even for firms showing losses and placed an unnaturally high pressure on managers, McAdams said. When combined with the leasing environment in which the computer industry operates, which requires a firm to absorb losses for a long period before it is in the black, the growth rate required an unusual degree of talent and ability from managers, which constituted a barrier to entry, McAdams said.

Without IBM Net, DP Industry In the Red During 12 Years

NEW YORK — The proof that IBM does have monopoly power is that it sustained high and increasing profits over a long period of time, which would in an open market foster competition and new entrants, government witness Alan K. McAdams testified in the U.S. vs. IBM trial.

In fact, IBM's profits were so great from 1960 to 1972 that its results were solely responsible for the industry showing overall profitability, according to figures from McAdams. Excluding IBM's results, the industry showed a pretax loss each year.

The government's Exhibit 5112 details the pretax profits and losses from operations of 11 firms and shows that only four in addition to IBM had aggregate earnings in 1972 for the preceding 12-year period. These were Control Data Corp. ($98.2 million), Digital Equipment Corp. ($93.6 million), Honeywell Corp. (nearly $51 million) and Singer Corp. ($1.2 million in 1972; Singer reported results only for that year.)

NCR showed the largest aggregate loss — $453.75 million — for the 12 years, followed by RCA, $346.1 million; General Electric Co., $254.1 million; Univac $90.3 million; and Burroughs, $25.8 million.

In 1960, the industry except IBM lost $71.9 million, but the total with IBM showed a $218.96 million profit.

In 1965, without IBM, the industry lost $102 million compared with earnings of $486.4 million when IBM's share was added.

The industry without IBM showed a profit in one year, 1969, when it earned $41.8 million. After IBM's results, the industry showed a tidy $1.11 billion.

Hard Times

But in 1970, when hard times hit, the results were vastly different. The industry without IBM lost $92.2 million compared with earnings of $802.4 million including IBM's profits.

In 1971, excluding GE's and IBM's figures, the industry showed a loss of $140.7 million compared with earnings of $705.9 million when including IBM's results.

In 1972, RCA and GE did not report their results, having both exited from the business. The others sustained a combined loss of $49.9 million while profits with IBM were $923.4 million, according to McAdams.

Looking at the progress of various firms, one can see different styles of operation in effect. CDC operated in the black for 10 years until 1970 and 1971, then climbed back in the black in 1972. Univac, by contrast, incurred loses of over $15 million each year between 1960 and 1965 and then was in the black until 1971.

Mini maker Digital Equipment Corp., in a business which is primarily sales and not leases, never dipped into the red.

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Net Announcement Marks HP Policy Change

By Esther Surden
CW Staff

CUPERTINO, Calif. — With the announcement of the beginnings of a network architecture based on the CCITT X.25 standard [CW, Oct. 31], the Hewlett-Packard Co. here departed from its well-touted policy of announcing products only after they are ready for delivery.

The reason for the change was to give the company's users some idea of the developments they can expect in the future in this area from the firm and to let them know HP is devoted to producing products that will conform to the standard, according to James E. Candlin, development section manager for data communications networks and systems.

Several of the products that will allow this network concept to work have already been announced, including DS/3000 last May and DS/1000, which was introduced in 1963 and enhanced in 1975 and 1977.

This announcement "puts the cement in between the business and technical product lines," Candlin said. "Networks take a long time to build, and it is important for the management of the companies we deal with to know what direction HP will be taking in the future."

The recent announcement brought the company closer to providing a total communications solution; he claimed. When all the products are in place, HP will be supplying "what amounts to a turnkey network."

'Layered Approach'

The HP Distributed Systems Network consists of several functional layers in software, with only very high-level services visible to applications programmers and users, Candlin said. In most cases the user does not have to treat communications differently from other activities.

In addition, HP is using what is calls a "layered approach." The company can change the layers without making the user change his software investment. All protocol changes or other enhancements would be made transparent to the users.

"Communications is a complex business," Candlin stated. "We can hide much of it from the users."

Several factors contributed to HP's decision to make the announcement at this time, he noted. For example, a lot of progress had been made in the industry in determining an appropriate standard; HP waited until the standard had been developed.

In addition, the multilocation companies to which HP markets are very cautious about committing themselves to a vendor, and HP wanted them to be aware of its intentions.

It also waited until it could provide a solution, rather than a few tools to help sell its system, he noted.

Competition has led to a lot of progress in the mini area, Candlin said, and communications is going to become a very competitive issue as firms compete for their share of the distributed processing market.

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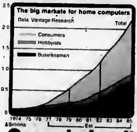

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Orders & Installations

Rensselaer Polytechnic Institute of Troy, N.Y., has purchased a Prime 500 computer system valued at $750,000 for interactive graphics applications and software development.

Frontier Airlines Credit Union has installed the Docutel Corp. Financial System 2000 in its Denver offices.

Blue Cross of Massachusetts has ordered Incoterm Corp. intelligent terminals, related hardware and services valued at approximately $700,000.

The Environmental Protection Agency has ordered a copy of United Computing Systems' Inform-11 data management systme for installation on its Digital Equipment Corp. PDP-11/70 in Cincinnati, Ohio.

Hyde Athletic Industries, Inc. of Cambridge, Mass. has ordered a Honeywell Level 62 computer system valued at $144,000 for on-line inventory control and order processing as well as for standard financial management applications.

Bechtel Power Corp. of Gaithersburg, Md., on behalf of the Standard Nuclear Unit Power Plant System group (Snupps), has ordered five nuclear power plant monitoring systems from Honeywell's Process Control Division.

Maryland Casualty Co., has ordered 29 DXS Data Exchange Systems valued at $1 million from Texas Instruments, Inc.

The Houston Area Teachers Credit Union has begun installation of Docutel Corp.'s Financial System 2000 at its main office.

The Retail Store Employees Union of St. Louis, Mo., has ordered a Honeywell Level 62 computer system to replace its current Honeywell Model 2020. The system is valued at $171,000.

Lowry Enterprises has ordered a Univac 90/30 system for installation in its St. Louis, Mo., headquarters.

Steak 'n Shake, Inc., Indianapolis, has ordered up to 200 Model 3220 Documentor point-of-sale management systems valued in excess of $1.5 million from Addressograph-Multigraph Corp.

E.F. Johnson of Waseca, Minn., Dayton Walther Corp. of Dayton, Ohio, and the Fabri-tek Corp. of Edina, Minn., have installed Comserv Corp.'s CAS-III financial reporting software system.

The Commonwealth of Puerto Rico Highway Authority has ordered a Honeywell Model 68/80 Multics system valued at $5 million.

Hurd Associates, a Fremont, Calif., software firm, has ordered 20 Honeywell Level 6 minicomputers.

Fireman's Fund of San Rafael, Calif., has ordered a Stor/168 add-on memory system from Cambridge Memories, Inc.

The *Paterson* (N.J.) *Morning and Evening News* has ordered a Tal-Star Computer System, Inc. T-410S publishing system for its news, display and classifed text processing.

Midwest Electric, Inc. of St. Mary's Ohio, has ordered a Honeywell Level 62 computer system valued at $135,000.

The Evanston, Ill., Public Library installed a Libs 100 Circulation Control System.

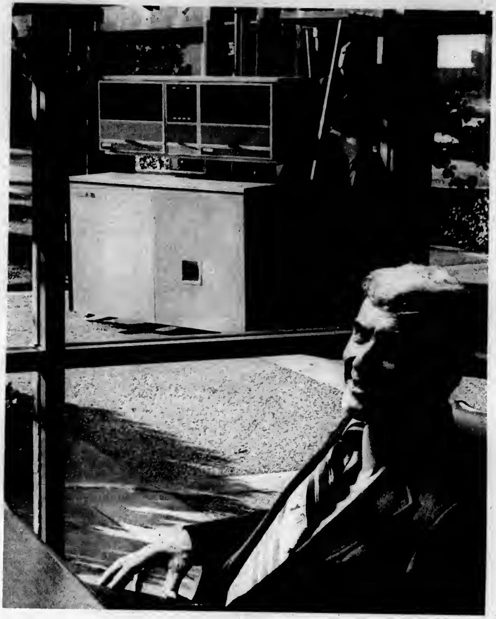
Illinois Auto Electric, an automotive parts warehouse distributor, has ordered a Honeywell Level 64 system valued at $550,000.

Republican and American **of Waterbury, Conn. has ordered a Decedit computerized copy and editing system valued at $260,000 from Digital Equipment Corp.'s Graphic Arts Group.**

Howard Community College in Columbia, Md., has ordered the Necol conversion package from Computer Facilities Software Ltd., of Cleckheaton, England.

O.Z./Gedney Co. of Terryville, Conn., has ordered 20 Cado System 40 computers from Desco Data Systems.

The Catawba Memorial Hospital of Hickory, N.C., has ordered a Honeywell Level 62 computer system to perform its accounting functions. The Level 62 system is valued at $217,000.



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'Natural Outgrowth'

Key Tronic Taking on OCR, End-User Markets

By Esther Surden
CW Staff

SPOKANE, Wash. — Key Tronic Corp. here is making the transition from being a one-product firm that serves data entry terminal makers with customized keyboards to being a two-product company that serves both end users and manufacturers.

The product responsible for the transition is a line of OCR equipment that Lewis Zirkle, founder of the company, said is a natural outgrowth of the firm's initial product. The privately held company was founded in 1969 with electronic keyboards its only product.

Although there were other keyboard makers in the field already, Zirkle saw a need for a supplier of keyboards that would "give complete service" to independent producers of data entry equipment, he reported.

"About three years ago, we recognized we were becoming a leader in keyboards," he stated. The firm also recognized that it was a one-product firm and needed to diversify, Zirkle added.

The turn toward OCR came very naturally for the company since it was already in the data entry field, he noted. When considering which way to diversify, the company really only contemplated staying in data entry. Since it was already making tactile data entry devices, the only other options open to it were voice data entry or camera data entry, he said. It chose the camera technique.

Unique Niche

Zirkle feels his company has a product that occupies a unique niche in the marketplace. Most OCR systems require that a user trade in his present computer for a system that processes using OCR for data entry. "We haven't tried to change anybody's system. We recognized that data entry was the most expensive part of DP" and tried to make that more efficient.

The company's desktop units and hand-held wands are used as additions to the user's system, he noted.

Both parts of Key Tronic's business are growing. "Last year the keyboard operation expanded 45% over the year before" and that part of the business has been growing steadily since it began, the president said.

Zirkle predicted that the 45% growth rate will be maintained this year. The OCR operation is in what he called the "initial order stage" with customers ordering trial units before committing themselves to large orders.

The controversy over whether or not OCR will proliferate or die not withstanding, Zirkle predicted that within two or three years OCR could be a major or the predominant portion of the company's business.

"There must be some improvement in its implementation," he admitted, but technology is continuing to improve the equipment. In the future, OCR equipment will probably have microprocessors used in it, making the systems not only more economical to purchase but also cheaper to use, he added.

Although seemingly very different, the two aspects of Key Tronic's business are really similar, he continued. Both involve customization. Each manufacturer wants a particular feature to be on its keyboard in the same way that an end user wants the OCR system customized to his operation, he said.

Market Challenge

The OCR side of the business represents a marketing challenge to the officers of Key Tronic. That challenge is being met through the use of two marketing approaches.

First, the company has identified particular market segments with applications that can benefit from using OCR in addition to their present way of handling business. Secondly, it has begun setting up independent "agents" in 10 major cities to exclusively sell the company's OCR line.

Since the firm prides itself on offering users service with the product, it will handle all service and support directly. Later, this situation could change and support could be shifted to the agents after they become established, according to Fred Zirkle, president of the OCR division.

Major marketing areas for the OCR equipment include remittance processing, bank card processing, check processing and airline ticket processing, he said. "Our approach differs [from other vendors'] in that we don't sell a complete system," Fred Zirkle said.

"We are the only OCR company I know of that offers users the capability to upgrade their own systems with OCR," he said. The systems his firm sells allow the user to process with proven hardware and software, he continued. When Key Tronic looked into establishing its OCR business, it wondered why the technique had not been successful in the past, he said.

One of the reasons was the price of the equipment. It was difficult to find equipment for less than $50,000 and the average system cost about $150,000, he noted.

"The biggest problem we saw was that in order to buy OCR capability, users had to buy from an unproven company trying to prove itself in OCR" as well as in system software and hardware.

Within the company's OCR equipment, the OCR transport is outpacing the wand mechanism in sales.

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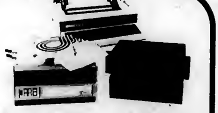

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Financial News

DP Gains Help Honeywell Show Quarter Revenue Rise

MINNEAPOLIS – Honeywell, Inc.'s revenues and operating earnings rose for the third quarter and nine months compared with the year-ago figures.

Worldwide computer rental and service revenues rose 15.5% in the quarter, contributing to the corporate total of $711.6 million compared with $638.5 million in the third quarter last year.

Operating earnings for the quarter grew to $36 million compared with $24.9 million in the year-ago period, when there was also a $12 million capital gain from the sale of shares in Honeywell-Bull. The gain raised 1976 net income to nearly $37 million.

Per-share income was $1.70 this quarter compared with $1.80 in the same period last year.

Purchase revenues from computers also were higher for both the third quarter and nine months. Net computer bookings worldwide were higher for the nine months, and third-quarter bookings exceeded those of the same period in 1976, the firm said. Bookings were especially strong in Europe.

Computer operating margins continued to improve, the company said.

During the nine months, revenues and earnings exceeded those of the year-ago period, which included the $12 million credit.

Earnings rose to $96.5 million or $4.58 a share compared with $69.9 million or $3.21 a share in the year-ago period, while revenues approached $2.1 billion compared with $1.78 billion in the nine months of 1976.

CII-Honeywell Bull "is performing somewhat in excess of expectations for 1977, and we are realizing the benefits expected from the merger," according to Edson W. Spencer, president and chief executive officer.

"The French government continues its support of the new company, and Honeywell is benefiting from strong research and development capabilities in France," he added.

STC Sets Record In Third Quarter

LOUISVILLE, Colo. – Storage Technology Corp. (STC) chalked up a record third quarter with earnings up 56% and revenues 45% over the comparable period last year.

Earnings totaled $3.1 million or 57 cents a share compared with nearly $2 million or 40 cents a share in the same quarter last year.

Revenues reached $40.8 million compared with $28.2 million in the 1976 period. Rental and service income accounted for $14.6 million and $10.8 million respectively.

For the nine months, STC's earnings grew to $7.5 million or $1.44 a share compared with $5.3 million or $1.08 a share in last year's perod. Revenues reached $70.5 million compared with $56.9 million in the year-ago nine months.

All per-share amounts were adjusted for the 6% stock dividend declared in the first quarter of 1977.

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Univac Boost Aids Sperry

NEW YORK – Sperry Rand Corp.'s second-quarter earnings rose 6.3% and revenue gained 8.8% over the comparable period last year, boosted by a 12% rise in revenues from Univac computers.

During the quarter ended Sept. 30, the firm earned $39.9 million or $1:05 a share compared with $37.5 million or 98 cents a share in the same quarter last year.

Revenues reached $844.3 million compared with $776.2 million in the last year's quarter.

Computer orders were up 13% and backlog rose 25%, the firm said.

J. Paul Lyet, chairman, said the firm expects the momentum in new orders for computers to continue as a result "of further new product introductions and the continued buildup in our marketing organization."

For the six months, Sperry Rands' earnings rose to $77.4 million or $2.03 a share compared with $72.3 million or $1.90 a share in the same period last year.

Results for the quarter and the six months reflect increased revenue and income from the computer, fluid power and guidance and control businesses, Lyet said.

Backlog for the coroporation at the end of September was $2.16 billion, up 17% over a year ago.

Profits of New Holland farm equipment division were down from a year ago on slight increase in revenue.

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- Selecting the right terminal for the right job in the right network.
- Case histories of successful networks and how they were designed and configured
- An evaluation of IBM's Systems Network Architecture
- The tradeoffs between private line networks and packet networks

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Earnings Reports

CALIFORNIA COMPUTER
Year Ended June 30

	1977	s1976
Revenue	$116,224,000	$121,891,000
Loss	1,692,000	4,148,000

s-Restated

COMPUTER COMMUNICATIONS
Year Ended June 30

	1977	1976
Shr Ernd	$.51	$.40
Revenue	13,522,380	8,239,284
Tax Cred	923,000	580,000
Earnings	1,613,593	1,104,473
3 Mo Shr	16	.19
Revenue	3,519,919	2,860,538
Tax Cred	283,000	230,000
Earnings	479,917	484,424

CONTROL DATA
Three Months Ended June 30

	1977	1976
Shr Ernd	3.85	$.67
Revenue	369,797,000	335,135,000
Earnings	14,597,000	11,597,000
6 Mo Shr	1.52	1.25
Revenue	706,026,000	641,599,000
Earnings	28,294,000	21,667,000

CPT
Year Ended June 30

	1977	1976
Shr Ernd	$1.02	$.83
Revenue	13,025,466	19,941,184
Earnings	1,303,271	973,046
3 Mo Shr	.41	.28
Revenue	4,840,339	314,449
Earnings	539,072	314,446

CRAY RESEARCH
Three Months Ended June 30

	1977	1976
Shr Loss	$.45	3.21
Revenue	527,327	.....
Loss	634,206	266,019
6 Mo Shr Loss	.80	.53
Revenue	1,036,301	.....
Loss	1,121,779	579,846

TELEFILE
Three Months Ended June 30

	1977	1976
Shr Ernd	$.35	$.43
Revenue	3,505,283	2,170,398
Earnings	479,296	530,631
6 Mo Shr	.29	.27
Revenue	5,719,477	3,644,801
Earnings	390,971	332,050

TRANSNET
Year Ended June 30

	1977	1976
Shr Ernd	$.27	$(.07)
Revenue	5,574,125	574,519
Earnings	566,228	(99,928)

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WABASN
Six Months Ended June 30

	1977	1976
Shr Ernd	$.85	$.75
Revenue	44,227,000	20,079,000
Earnings	1,653,000	1,284,000

WYLY
Three Months Ended June 30

	1977	1976
Revenue	318,000,000	$15,700,000
Disc Op	300,000	(81,200,000)
Loss	600,000	$2,800,000
6 Mo Rev	35,000,000	31,100,000
Disc Op	300,000	(65,300,000)
Loss	1,800,900	67,800,000

s-Restated for discontinued operations.

AUTOMATIC DATA PROCESSING
Year Ended June 30

	1977	s1976
Shr Ernd	$1.58	$1.24
Revenue	245,487,000	199,244,000
Earnings	23,308,000	18,732,000
3 Mo Shr	.45	.36
Revenue	84,554,000	55,347,000
Earnings	5,650,000	5,403,000

s-Restated for pooling-of-interests transactions.

BOLT BERANEK & NEWMAN
Year Ended June 30

	1977	1976
Shr Ernd	.....	$.47
sRevenue	$26,573,209	23,925,000
Disc Op	590,400	(858,700)
Loss	824,600	281,300
3 Mo Shr	.....	.11
sRevenue	6,077,700	5,957,700
Disc Op	50,300	(233,300)
Earnings	(1,103,900)	.134,000

s-Sales from continuing operations

GENERAL COMPUTER SYSTEMS
Year Ended June 30

	1977	1976
Shr Ernd	$.83	.....
Revenue	13,069,000	$9,492,000
Tax Cred	849,000	.....
sSpec Cred	455,000	.....
Earnings	1,813,000	(3,919,000)

s-From settlement of debt.

MANAGEMENT ASSISTANCE
Three Months Ended June 30

	1977	1976
Shr Ernd	$.56	a$.42
Revenue	38,400,000	31,600,000
Tax Cred.	1,900,000	1,100,000
Earnings	4,300,000	5,200,000
9 Mo Shr	1.59	s1.21
Revenue	110,100,000	88,700,000
Tax Cred	4,500,000	3,600,00
Earnings	12,200,000	8,200,000

s-Adjusted to reflect one-for-four reverse stock split in October 1976.

MEMOREX
Three Months Ended Sept. 30

	a1977	1976
Shr Ernd	$2.17	$1.80
Revenue	114,131,000	84,329,000
Tax Cred	3,722,000	3,909,000
Earnings	14,100,000	10,293,000
9 Mo Shr	6.47	4.96
Revenue	326,066,000	244,578,000
Tax Cred	16,342,000	10,835,000
Earnings	40,910,000	28,532,000

a-Includes nine-months operating results of BST, subsidiary acquired in July 1977 on a pooling-of-interests basis.

3M
Three Months Ended June 30

	1977 (000)	1976 (000)
Shr Ernd	$.94	$.83
Revenue	1,005,000	891,700
Earnings	106,500	95,500
6 Mo Shr	1.69	1.43
Revenue	1,941,000	1,729,000
Earnings	195,200	184,400

MODULAR COMPUTER SYSTEMS
Three Months Ended June 30

	1977	1976
Shr Ernd	$.15	.....
Revenue	13,830,000	$7,415,000
Earnings	512,000	(4,045,000)
6 Mo Shr	.28	.....
Revenue	26,940,000	17,293,000
Earnings	855,000	(3,977,000)

s-Restated to include the acquisition in 1977 of ECS Information Systems, Inc. on pooling-of-interests basis.

NCR
Three Months Ended Sept. 30

	1977 (000)	1976 (000)
Shr Ernd	$1.18	$.93
Revenue	604,245	569,504
aEarnings	33,322	25,049
9 Mo Shr	3.02	2.19
Revenue	1,747,297	1,596,667
aEarnings	84,355	56,776

a-Includes pretax gain of $2,530,000 from sale of securities in 1977 and pretax gain of $2,134,000 from sale of a subsidiary in 1976.

RAPIDATA
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.10	$.03
Revenue	4,368,000	3,925,000
Earnings	194,085	46,594
6 Mo Shr	.39	.16
Revenue	13,439,000	11,483,000
Earnings	a656,148	329,955

a-Includes $181,612 gain on sale of certain assets.

SHARED MEDICAL SYSTEMS
Three Months Ended June 30

	1977	1976
Shr Ernd	$.66	$.48
Revenue	19,867,000	8,729,000
Earnings	1,672,00	1,260,000
6 Mo Shr	1.06	.87
Revenue	21,201,00	17,134,000
Earnings	3,222,000	2,277,000

SOLA BASIC INDUSTRIES
Three Months Ended June 30

	1977	1976
Shr Ernd	$.35	a$.36
Revenue	45,096,119	42,445,941
Earnings	1,665,319	1,603,477

s-Adjusted to reflect a 50% stock dividend paid in November 1976

SPERRY RAND
Three Months Ended Sept. 30

	1977 (000)	1975 (000)
Shr Ernd	$1.05	$.88
Revenue	944,329	776,155
Earnings	39,877	37,519
6 Mo Shr	2.03	1.90
Revenue	1,872,211	1,564,206
Earnings	77,393	72,327

T-BAR
Three Months Ended June 30

	1977	1976
Shr Ernd	$.25	a$.16
Revenue	2,170,346	1,606,297
Earnings	153,287	106,106
6 Mo Shr	.45	a.32
Revenue	3,955,076	2,919,504
Earnings	273,046	191,512

a-Adjusted for a 7.5% stock dividend paid in April 1977.

TELEDYNE
Three Months Ended June 30

	1977 (000)	1976 (000)
Shr Ernd	$2.06	a$2.46
Revenue	824,637	461,877
Earnings	25,385	31,872
5 Mo Shr	6.66	a4.84
Revenue	1,970,496	841,827
Earnings	83,401	85,160

s-Adjusted for a 3% stock dividend paid in May 1977

TELEX
Three Months Ended June 30

	1977	1976
Shr Ernd	$.04	$.11
Revenue	32,026,000	24,602,000
Earnings	1,555,000	1,138,000

TESDATA SYSTEMS
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.23	$.42
Revenue	3,211,000	2,899,000
Earnings	294,000	403,000
9 Mo Shr	1.01	1.04
Revenue	6,936,000	7,436,000
Earnings	1,173,000	965,000

TEXAS INSTRUMENTS
Three Months Ended June 30

	1977	1976
Shr Ernd	$1.21	$.98
Revenue	493,300,000	392,198,000
Earnings	27,631,000	22,569,000
6 Mo Shr	2.41	1.91
Revenue	955,221,000	791,665,000
Earnings	54,975,000	43,856,000

TRW
Three Months Ended June 30

	1977 (000)	1976 (000)
Shr Ernd	$1.16	$1.03
Revenue	825,600	743,800
Earnings	42,600	37,800
6 Mo Shr	2.02	1.75
Revenue	1,602,500	1,466,300
Earnings	74,200	84,300

TYMSHARE
Three Months Ended Sept. 30

	1977	s1976
Shr Ernd	$.40	$.27
Revenue	22,026,901	19,001,399
Earnings	1,774,594	1,160,398
9 Mo Shr	1.61	1.21
Revenue	72,009,157	62,270,324
Earnings	6,622,669	5,252,867

a-Restated to reflect acquisition on pooling-of-interests basis.

WANG LABORATORIES
Three Months Ended Sept. 30

	1977	1976
Shr Ernd	$.19	a$.19
Revenue	36,221,009	24,389,000
Earnings	1,859,000	1,011,000
Year Ended June 30		
Shr Ernd	$.88	$.60
Revenue	134,535,000	96,856,000
Earnings	8,124,000	5,172,000

a-Adjusted for a Class B stock dividend paid in July 1977.

AMDAHL
Three Months Ended July 1

	1977	1976
Shr Ernd	$1.43	$.36
Revenue	45,067,000	13,827,000
Tax Cred	5,190,000	807,000
Earnings	11,045,000	1,681,000
6 Mo Shr	2.72	.69
Revenue	83,094,000	29,291,000
Tax Cred	9,985,000	1,473,000
Earnings	21,228,000	3,074,000

AMERICAN MICROSYSTEMS
Three Months Ended July 2

	1977	1976
Shr Ernd	$.27	$(2.39)
Revenue	18,145,000	15,513,000
Earnings	537,000	(5,298,000)
6 Mo Shr	.46	(4.10)
Revenue	34,659,000	32,035,000
Earnings	1,127,000	(9,146,000)

AMPEX
Three Months Ended July 30

	1977	1976
Shr Ernd	$.41	$.17
Revenue	70,774,000	65,446,000
Tax Cred	1,890,000	679,000
Earnings	4,522,000	1,812,000

ANALOG DEVICES
Three Months Ended July 30

	1977	1976
Shr Ernd	$.40	a$.31
Revenue	13,878,499	19,468,451
Earnings	774,841	531,537
6 Mo Shr	1.03	a.85
Revenue	36,292,051	26,811,889
Earnings	1,636,430	1,409,660

a-Adjusted to reflect 5% stock dividend paid in April 1977.

AVX
Three Months Ended July 2

	1977	1976
Shr Ernd	$.65	$.47
Revenue	11,145,000	8,742,000
Earnings	731,000	527,000
6 Mo Shr	1.91	.73
Revenue	20,938,000	16,232,000
Earnings	1,139,000	829,000

BALL
Three Months Ended Oct. 2

	1977	1976
Shr Ernd	$.89	$.75
Revenue	116,611,000	103,596,000
Earnings	4,165,000	4,741,000
9 Mo Shr	2.55	2.39
Revenue	342,936,000	301,409,000
Earnings	11,923,000	11,061,000

CIE. DES MACHINES BULL
18 Months Ended June 30

	1977	a1976
Earnings	b$11,100,000	.....

a-Comparative figures unavailable; company has changed to a fiscal year ending June 30. b-Computed at the French franc's current rate.

COMPUGRAPHIC
Three Months Ended July 2

	1977	1976
Shr Ernd	$1.07	$.95
Revenue	34,177,000	29,254,000
Earnings	2,477,000	2,049,000
6 Mo Shr	3.11	2.78
Revenue	95,125,000	70,480,000
Earnings	7,134,000	5,469,000

COMPUTER AUTOMATION
Three Months Ended Oct. 2

	1977	1976
Shr Ernd	.66	.37
Revenue	11,963,000	7,854,000
Earnings	1,315,000	723,000
Year Ended July 3		
Shr Ernd	$2.70	$1.60
Revenue	43,038,000	30,398,000
Earnings	5,317,000	3,098,000

COMPUTER PRODUCTS
Three Months Ended July 1

	1977	1976
Shr Ernd	$.14	a$.09
Revenue	2,111,595,	1,449,843
Earnings	199,406	129,657
6 Mo Shr	.25	a.17
Revenue	4,004,864	2,796,293
Earnings	358,230	243,274

a-Reflects 20% stock dividend in November 1975.

COMPUTER SCIENCES
Three Months Ended July 1

	1977	1976
Shr Ernd	$.22	$.23
Revenue	94,134,000	55,541,000
Tax Cred	.....	759,000
Earnings	5,150,000	3,288,000

COMTEN
Three Months Ended July 1

	1977	1976
Shr Ernd	$.19	$.12
Revenue	8,255,000	6,479,000
Tax Cred	146,000	148,000
Earnings	494,000	314,000
6 Mo Shr	.35	.17
Revenue	15,430,000	11,868,000
Tax Cred	266,000	106,000
Earnings	901,000	441,000

a-Adjusted for three-for-one stock split in November 1976.

DATAPOINT
Year Ended July 31

	s1977	1976
Shr Ernd	$2.55	$2.16
Revenue	103,023,000	72,059,000
Tax Cred	.....	495,000
Earnings	8,739,000	6,431,000
3 Mo Shr	.72	.57
Revenue	29,614,000	21,440,000
Earnings	2,353,000	1,679,000

s-Includes results of Amcomp, inc. from Jan. 17, 1977 date of acquisition.

DATARAM
Three Months Ended July 31

	1977	1976
Shr Ernd	$1.03	$.51
Revenue	3,703,000	1,761,000
Tax Cred	.....	60,000
Earnings	489,000	197,000

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HOUSTON
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4615 Southwest Frwy
Houston, TX 77027
(713)960-9102

KANSAS CITY
Suite 502
6405 Metcalf
Shawnee Mission
Kansas 66202
(913)236-6288

TULSA
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FIRMWARE ENGINEER - DIAGNOSTICS

Minimum 2 years' experience in hardware design, programming in assembly language of micro computers Diagnostics programming a definite plus. BSEE or equivalent desired

SENIOR ENGINEER - ANALOG

Requirements include BSEE degree with MSEE desired and seven years experience in either CRT display systems or data communication circuit design. CRT display systems experience must include knowledge of analog electronics, deflection components, flyback HV generation, and CRT characteristics Data communication circuit design experience must include knowledge of analog/digital techniques for transmitting data over long cables.

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A BSME is required, MSME highly desirable, plus at least 7 years' experience in the design of products involving small, high reliability mechanisms, preferably in the printed field or related to computer peripherals Your background should include leadership responsibility on development projects

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Minimum 2 years' experience with printed circuit board assembly methods a must, electro-mechanical assembly experience a definite plus should be experienced in processing and standards A degree in E E or equivalent experience is needed

USER LANGUAGE DEVELOPMENT

Participate in the development of COBOL/BASIC/RPG II Compilers and associated interpreters for Sycor 400 Series equipment. Responsibilities include language development, design and implementation. BS or MS in Computer Science or related field with relevant course work and/or experience. Knowledge of block structured language and one of COBOL/BASIC/RPG 11. Machine level programming, especially 8080 or other microprocessor would be a plus.

SYSTEMS LANGUAGE DEVELOPMENT

Participate in development of Sycor systems implementation language, SYCLOPS. Responsibilities include language development, compiler development, code generation for new microprocessors and application of source optimization techniques. BS or MS in computer science or related field with relevant course work and/or experience. Knowledge of block structured language and machine level programming, preferably for 8080 or other microprocessor is a plus.

DBMS DEVELOPMENT

Participate in the development of a generalized DBMS for Sycor systems using state of the art technique. BS or MS in computer Science or related field with emphasis on data structures and DBMS. Knowledge of a block structuad language and machine level programming, preferably for 8080 or other microprocessor is a plus.

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Requires BSEE Computer Science, Math or equivalent and three to five years software or diagnostic programming for 8080/Z-80 systems. Will develop console software and diagnostics for new product development.

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DATA COMMUNICATIONS PRE-SALES SUPPORT & DEVELOPMENT (CWS-46)

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- Design creative resolutions for customers data communications needs.
- Provide state-of-the-art data communications technical leadership

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- Pascal or Algol Programming
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OPERATING SYSTEMS DEVELOPMENT (CWS-48)

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A middle-management position, responsible for 20-30 professionals involved with PMS, Manufacturing, Procurement and Property. This position requires a minimum of 10 years' experience in development and implementation of computer systems with 5 years in a managerial role. A Master's degree or equivalent in Computer Science or Business Administration is required. Experience in systems analysis, COBOL programming, Data Base Management Systems and on-line applications is highly desirable.

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A highly responsible position, implementing and maintaining the ADABAS Data Base Management System and TASK/MASTER Data Communications Monitor on IBM 360/75 OS-MVT computer system. Requirements are BS Math, Computer Science or related technical field, design and implementation of DB/DC systems, working knowledge of OS/360 internals and input/output access methods, and experience in supporting IBM compatible 3270 terminal systems. Desire experience in development, maintenance and implementation of ADABAS and TASK/MASTER.

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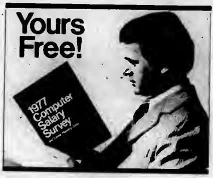

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This will be the key staff position providing direction, planning, budgeting, measurement of performance, and integration of the WILEY automated systems and will involve long and short range projections based on user input involving concepts, hardware, software and applications. MIS and standards will be developed for the corporation; and expert consultation provided on trends, justification policies, data base management, forecasting and modeling, computer use in publishing technology and strategic planning, and a variety of evaluations and special projects. At least 10 years of broad, current systems experience is essential with range of exposure valuable, and preferably an advanced degree, with one in Computer Science, Business, or Finance, and Marketing background will be helpful. Communication skills must be excellent.

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SALARY $22,000

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For consideration for this exempt level position which is located at our Corporate Software Development Lab in LOS GATOS, CALIFORNIA, please send resume in confidence to:

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SENIOR ANALYST

Data Communications

Expanding local division serving the nationwide financial community through a computer network seeks a qualified individual to join its real-time software development staff. Candidate should have five plus years experience in systems programming specializing in data communications.

Preference will be given to applicants with direct experience in Data General Eclipse assembly language, RDOS, INFOS, Etc.

We seek a self-motivating individual who can follow a project from initial design through final implementation. Salary to mid **$20s.**

Send resume and salary history in confidence to Mr. John Knox, Manager of Administration, 55 William St., Wellesley, Mass. 02181.

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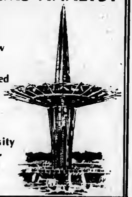

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Write: Personnel Office
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PROGRAMMER/ANALYSTS

- Responsibilities include completing a billing system for a community clinic and research for a possible federal grant program with future opportunity for CICS exposure. Experience working in a hospital environment and familiarity with medical terminology and third party billing are preferred. Knowledge of ANS COBOL, IBM 350/370 DOS JCL, familiarity with ISAM, VSAM and 3-5 years' experience (at least 1 year as a programmer/analyst) actively writing programs and doing analysis are required.
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Steve Tunney
Field Engineering District Manager

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To apply for one of the above locations call Mike Zimmerman at (800) 225-7346 (in Massachusetts call collect (617) 485-9201. Or send your resume, including salary history, in confidence to Mike at Data General Corp., 15 Turnpike Rd., Westboro, MA 01581.

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To apply for one of the above locations call Bruce Spencer collect at (415) 321-8010. Or send your resume, including salary history, in confidence to Bruce at Data General Corp., 2445 Faber Pl., Palo Alto, CA 94303.

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Applications are sought for Director of Academic Computing Services, George Mason University, the State University in Northern Virginia, with 9500 students is located in Metropolitan Washington, D.C. It offers 39 Baccalaureate and 17 Masters programs.

This is an opportunity to participate in the development of a university computing center. Minimum qualifications include MS in Computer Science or related field, 2 years experience in Computing Center operations, programming experience in high level languages, and an ability to work with a wide variety of computer users.

It is desired that the successful candidate have some knowledge of systems programming, experience in an academic computing environment and some evidence of administrative ability. Salary is commensurate with qualifications and experience. The position is available 1 February 1978. Send resumes and names of three references by 1 December 1977 to Professor Stephen B. Seidman, Graduate School Office, George Mason University, 4400 University Drive, Fairfax, VA. 22030. An EEO/AA employer.

MAINE

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Data General's Advanced Development Group has recently relocated to a new facility in the Research Triangle Park in Raleigh, North Carolina. We have responsibility for integrated hardware and software development of new systems so radical they'll knock your socks off. A strong emphasis on development tools and methods is an essential part of our work.

We're designing an interactive software development environment as an integral part of our advanced systems. If you're a creative professional with experience or strong interest in interactive, language oriented editors, debuggers, documentation tools, and structured design tools, get in touch with us!

Send your resume in confidence to Gerald Clancey, Director of Software Development, Data General Corp., 1100 Navaho Dr., Raleigh, NC 27609. Or call him collect at (919) 872-4710.

Data General

An equal opportunity employer M/F.

SOFTWARE SPECIALIST

Production expansion has dictated the need for a larger more efficient computer system. To meet that need, we have installed the Burroughs 6700. This large system plus the growing responsibilities of our systems and programing areas have caused us to seek out the most qualified individual to assume the challenging role of softare specialist for Medical Mutual of Cleveland, Inc.

The major responsibilities will include system implementation using B6700 systems. Must be experienced in B6700 system software in an on-line data base environment (NDL, CANOE, GEMCOS, DMSII, WFL . . .). Individual will also assume training and supervisory duties.

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Send resume and salary requirements to: Medical Mutual of Cleveland, Inc., 2060 East Ninth Street, Cleveland, Ohio 44115, Attn: Dee Dee Knight

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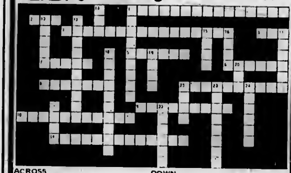

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8. Message switching
9. Collection of cryptic, graphic symbols
10. Double-octal
11. Everyone advocates it, no one does it
25. Transformation

DOWN

1. Caller's argument
12. Dartmouth language
13. Functional module
14. The increment by which programmers slowly go mad
15. List member
16. Programmer reaction when it runs right the first time
17. Device to keep bugs out
18. Sequence of instruction
19. Place where all garbage ends up
20. Started with cash registers
21. BPS
22. The opposite of batch
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H-6000

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R.H. Price
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University of Missouri-Columbia
307 Lewis Hall
Columbia, Missouri 65201

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Supervise data entry personnel, oversee training of user's in various data entry methods, analyze needs, research available data entry hardware and software, recommend acquisition and oversee installation of same. Knowledge of DEC system-10 and data entry devices desirable.

PROGRAMMER ANALYST-SERVICES

Collaborate with team leaders and other team members in designing, developing, and implementing computer applications in the auxiliary service areas (residential life, dining services, and safety services). Knowledge of DEC system-10, data base experience plus heavy COBOL is desirable.

The following two positions are classified as Computer Specialist II. Minimum qualifications: Bachelor's degree or equivalent experience plus one year's pertinent experience. Salary range: $11,616 to $18,048, normally starting salary not to exceed $13,020

ASSISTANT MANAGER/OPERATIONS

Oversee scheduling of administrative production jobs, be responsible for maintaining inventory of all computer supplies, supervise output dissemination section. Scheduling and operating experience desirable.

PROGRAMMER ANALYST - FINANCIAL

Participate as a team member in analysis, design, and programming projects, acquire a general overview of all financial team systems, and submit, monitor and check production runs as assigned. Knowledge of DEC system-10, COBDL and data base experience desirable.

The following four positions are classified as Computer Specialist I. Minimum qualifications: Associate's Degree in Data Processing or equivalent experience. Salary range: $10,572 to $16,428, normally starting salary not to exceed $11,856.

PROGRAMMER ANALYST - STUDENT RECORDS

Gain familiarity with Student Records area (including Admissions, Alumni, and Development systems) by performing programming and production tasks as assigned. Participate as a team member in maintenance and development projects. Knowledge of COBOL is desirable.

PROGRAMMER ANALYST - ACADEMIC CLUSTERS

(three positions) Consult with and aid users of terminal clusters and assist Team Leader as required. Knowledge of DEC system-10 as well as a programming language is desirable.

Resumes should be submitted no later than November 21, 1977, to:

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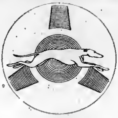

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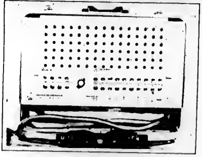

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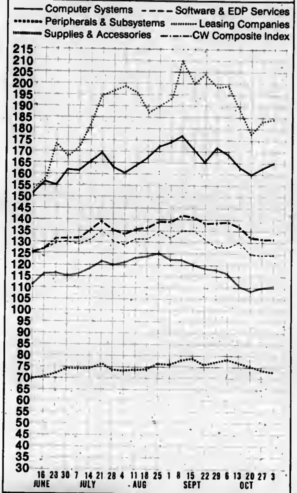

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e6 Mo Shr	1.63	76
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e-Reflects adjustment for three-for-one stock split effective May 26, 1976.

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	1977 (000)	1976 (000)
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Earnings	26,356	16,706

Year Ended July 2

Shr Ernd	$2.78	a$1.98
Revenue	1,058,814	736,286
Earnings	108,466	73,400

a-Adjusted for three-for-one stock split in November 1976.

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	1977	1976
Shr Ernd	$.41	$.33
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Earnings	2,938,000	2,366,000
6 Mo Shr	71	56
Revenue	170,280,000	111,032,000
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	1977	1976
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Revenue	5,411,000	8,247,000
Disc Op	......	644,000
Tax Cred	35,000	254,000
Earnings	(254,000)	582,000
6 Mo Shr	(.43)	(.13)
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Tax Cred	67,000	264,000
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TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING ARICES WEDNESDAY, NOVEMBEP 2, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1977 RANGE (1)	CLOSE NOV 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORA	22- 44	38	-1 1/4	-5.1
N	BUAROUGHS CORP	55- 91	65 7/8	-2 3/8	-5.5
O	COMPUTER AUTOMATION	18- 30	24 5/4	+1 5/4	+7.6
N	CONTROL DATA COAP	20- 26	20	-1 5/8	-A.4
O	CRAY AESEAACH INC	15- 29	21 1/4	-1	-4.4
N	DATA GENERAL COAP	35- 51	44 5/8	- 5/8	-0.8
N	DATAAOINT.COAP	18- 32	31 5/8	+5 3/8	+11.9
N	DIGITAL EQUIPMENT	57- 55	43 1/2	-1 1/2	-3.3
N	ELECTAONIC ASSOC.	2- 3	2	+ 1/8	+6.6
A	ELECTRONIC ENGINEEP.	8- 11	9 7/8	+ 1/4	+2.5
O	FOUO-AHASE SYSTEMS	13- 19	17 1/8	+ 1/2	+3.0
N	FOKBORO	41- 54	42 1/2	- 1/4	-0.5
O	GENERAL AUTOMATION	6- 9	5 5/4	- 1/4	-4.1
:	GAI COMAUTER CORP	1- 1	5/8	+ 1/8	+25.0
N	HEWLETT-PACKAPD CO	69- 87	70 3/8	- 1/8	-0.1
N	HONEYWELL INC	45- 55	43 3/8	-2 1/4	-4.9
N	IBM	245-284	249 5/8	-10 7/8	-4.1
C	MANAGEMENT ASSIST	5- 9	8	+ 7/8	+12.2
O	MICPODATA COFO	7- 10	11 1/4	- 1/8	-1.0
O	MODULAA COMOUTER SYS	5- 8	7 1/4	+1	+16.0
N	NCR	32- 47	40	-1 1/2	-5.6
O	PAIME COMPUTER INC	12- 25	19 1/8	-1 5/8	-6.7
N	AEARIN-ELMER	17- 22	17 7/8	- 7/8	-4.4
N	PAYTHEON CO	16- 55	28 7/8	-1	-5.5
N	SACROY FAND	30- 42	31 3/8	+ 5/5	+2.0
O	SYCOR INC	8- 15	14	0	0.0
A	SYSTEMS ENG. LABS	5- 8	6 5/8	- 1/4	-3.6
A	WANG LABS.	10- 14	10 3/8	- 3/4	-6.7

LEASING CORAANIES

EXCH		1977 RANGE (1)	CLOSE NOV 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORA	3- 5	4 1/2	0	0.0
C	BOOTHE COURIER CORF	8- 10	10 3/4	+ 3/8	+5.6
O	CONDISCO INC	10- 15	10 3/4	+ 1/4	+2.5
A	COMMERCE GROUP CORA	1- 3	7/8	0	0.0
A	COMPUTER INVSTRS GRA	1- 2	1	0	0.0
N	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 2	2	0	0.0
N	DAF INC	6- 9	8	+ 1/8	+1.5
N	ITEL	13- 22	17 3/8	- 1/8	-0.7
N	LEASCO CORA	19- 27	22 7/8	+ 1/2	+2.2
O	LFASAAC CORP	1- 2	1	0	0.0
O	NAG INC	1- 1	1/8	0	0.0
A	AIONEER TER CORA	5- 11	5 3/8	0	0.0
N	U.S. LFASING	10- 15	12 5/8	+ 1/8	+1.0

EXCH: N=NEW YORK; A=AMERICAN; P=AHIL-BALT-WASH
C=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID ARICES AS OF 3 A.M. OR LAST BID
(1) TO NEAREST DOLLAR

SOFTWARE & EOA SERVICES

EXCH		1977 RANGE (1)	CLOSE NOV 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMA TECH	1- 2	1/2	0	0.0
D	AMACOMP INC	7- 10	8 5/4	+ 1/4	+2.9
A	AAPLIED DATA AES.	5- 10	7 1/4	- 1/4	-5.1
N	AUTOMATIC DATA PROC	23- 50	26	- 1/2	-1.8
O	COLEMAN AMERICAN COS	2- 2	1 7/8	0	0.0
O	COMPU-SERV NETWORR	9- 15	9 3/4	0	0.0
O	COMA ELECTION SYSTMS	6- 10	9 1/2	+ 1/2	+5.5
D	COMAUTER HORIZONS	1- 1	1 1/4	0	0.0
D	COMPUTER NETWORR	6- 11	9 3/8	+ 1/8	+1.5
N	COMAUTER SCIENCES	7- 9	7 5/8	- 1/8	-1.6
O	COMPUTER TASK GAOUA	1- 2	1 7/8	0	0.0
O	COMPUTEA USAGE	1- 5	1 3/8	- 1/8	-8.3
D	COMSHAPE	5- 8	6 5/4	+ 1/4	+3.8
D	DATA DIMENSIONS INC	5- 5	4 3/8	+ 1/4	+6.0
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	14 1/4	+ 1/4	+1.7
O	INSYTE CORA	2- 3	1 1/4	0	0.0
C	IAS COMAUTER MASRET.	1- 2	2	+ 5/8	+25.0
O	KEANE ASSOCIATES	5- 4	3 7/8	- 3/8	-8.8
O	REYDATA CORP	2- 3	1 1/2	0	0.0
A	LOGICON	7- 17	11 5/4	- 5/8	-5.0
A	MANAGEMENT DATA	1- 2	1 1/8	+ 1/8	+12.5
A	NATIONAL CSS INC	19- 27	25 5/8	+1 1/2	+6.2
O	NATIONAL DATA CORP	4- 7	5 7/8	- 1/4	-4.0
A	ON LINE SYSTEMS INC	16- 22	17	+ 5/8	+3.8
N	ALANNING RESEAACH	3- 6	3 7/8	0	0.0
O	AROGRAMMING & SYS	1- 1	1/4	- 1/8	-33.5
D	RAPIDATA INC	2- 3	2 5/8	- 1/4	-9.5
O	AEYNOLDS & REYNOLD	17- 20	17 3/4	+ 1/4	+1.4
O	SCIENTIFIC COMPUTERS	1- 4	5 1/2	+ 1/4	+7.6
D	TYMSHARE INC	14- 23	18 1/2	- 5/8	-1.9
A	URS SYSTEMS	4- 5	4 5/8	+ 1/4	+5.7
A	WYLY CORA	1- 2	3/4	0	0.0

AERIAHERALS & SUBSYSTEMS

EXCH		1977 RANGE (1)	CLOSE NOV 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	12 7/8	0	0.0
O	ADVANCED MEMORY SYS	7- 9	7	+ 1/4	+5.7
N	AMFER CORP	8- 11	8 3/4	- 1/2	-5.4
D	ANDERSON JACOBSON	3- 5	3 5/4	0	0.0
N	AAPLIED DIG DATA SYS	10- 20	15 1/8	- 3/8	-2.7
D	BEEHIVE INT'L	6- 12	5 7/8	-1 7/8	-24.1
A	BOLT, BERANER & NEW.	7- 9	6 3/4	- 5/8	-8.4
N	BUNRER-RAMO	8- 12	10	- 5/8	-3.6
A	CALCOMP	3- 5	2 5/8	- 3/8	-12.5
D	CAMBRIDGE MEMORIES	1- 4	3	- 3/8	-12.4
N	CENTRONICS DATA COMP	20- 30	19 7/8	- 5/8	-5.0
O	COGNITADNICS	1- 1	3/4	0	0.0
O	COMPUTER COMMUN.	5- 8	6	+ 3/8	+6.6
O	COMAUTER CONSOLES	4- 7	5 5/4	0	0.0
A	COMPUTER EQUIPMENT	2- 5	2 5/4	- 1/4	-8.3
O	COMPUTER TRANSCEIVER	1- 1	1 1/4	0	0.0
O	CONTEN	9- 13	9 1/2	- 1/4	-2.5
N	CONRAC CORP	19- 28	19 5/8	- 1/4	-1.2

EXCH		1977 RANGE (1)	CLOSE NOV 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	DATA ACCESS SYSTEMS	4- 5	3	- 1/2	-14.2
C	DATA 100	6- 9	7 3/8	0	0.0
A	DATA APODUCTS CORP	9- 17	15 5/8	0	0.0
O	DATA TECHNOLOGY	5- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	1 3/4	0	0.0
O	DECISION DATA COMPUT	2- 3	1 7/8	0	0.0
-	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	7 5/8	+ 1/2	+7.0
O	DATARAM CORP	2- 12	9 1/2	- 5/4	-7.3
N	ELECTAONIC M & M	4- 5	3 1/2	- 1/8	-5.4
O	FABRI-TEK	1- 2	1 1/8	0	0.0
O	GENEAAL COMPUTER SYS	0- 2	1	- 1/8	-11.1
N	HAZELTINE COAP	8- 12	8 1/4	+ 1/8	+1.5
N	HAPPIS CORP	28- 39	37 3/4	+ 7/8	+2.3
A	INCOTERM CORP	10- 17	16 3/4	- 1/4	-1.4
O	INFOREX INC	4- 7	4 7/8	- 1/8	-2.5
O	INFORMATION INTL INC	9- 14	9 1/2	- 1/4	-2.5
O	INTEL CORP	38- 57	42	-1	-2.5
A	LUNDY ELECTRONICS	3- 6	4 5/8	+ 1/4	+6.0
-	MSI DATA CORA	6- 13	11 3/8	- 1/2	-4.2
O	MEMOREK	23- 34	24 7/8	-1 7/8	-7.0
N	MOHAWK DATA SCI	5- 8	5	- 3/8	-6.9
O	AENRIL CORP	2- 5	4 3/4	+1	+26.4
N	AERTEC CORP	7- 9	8 7/8	+ 1/8	+1.4
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	4- 5	3 1/2	0	0.0
1	RECOGNITION EQUIP	6- 13	6 7/8	- 1/8	-1.7
-	SCAN DATA	1- 2	7/8	-	-6.7
O	STORAGE TECHNOLOGY	10- 18	16 1/4	+ 1/8	+0.7
O	T BAR INC	7- 13	11 3/8	+ 5/4	+7.0
D	TALLY CORA.	4- 6	3 1/2	- 3/8	-9.6
A	TEC INC	7- 10	7 1/8	- 1/4	-3.5
N	TERTRONIR INC	29- 38	36 7/8	- 1/8	-0.5
N	TELER	2- 3	2 1/4	+ 1/8	+5.8
D	WILTER INC	1- 1	5/4	+ 1/4	+50.0

SUPALIES & ACCESSORIES

EXCH		1977 RANGE (1)	CLOSE NOV 2 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS ARDOS	6- 5	5 3/4	- 1/8	-2.1
O	BALTIMOAE BUS FORMS	1- 4	1 1/4	0	0.0
A	BARRY WRIGHT	10- 14	12 1/2	0	0.0
O	CYBEANATICS INC	1- 1	1	0	0.0
O	DUPLEA ARODUCTS INC	14- 19	16 7/8	- 1/8	-0.7
N	ENNIS BUS. FORMS	6- 7	5 7/8	+ 1/8	+2.1
O	GRAHAM MAGNETICS	11- 17	17	+ 1/4	+1.4
O	GRAPHIC CONTROLS	13- 18	15	+ 1/4	+5.2
N	3M COMPANY	46- 56	44 1/4	- 1/4	-0.5
O	MOORE CORP LTD	24- 37	25 5/4	- 1/4	-1.0
N	NASHUA CORA	16- 28	19 3/8	+ 5/4	+4.0
-	STANDARD REGISTEA	18- 25	21	- 1/4	-1.1
D	TAB PRODUCTS CO	10- 19	9 1/2	- 1/4	-2.5
N	UARCO	18- 22	18	- 1/2	-2.7
A	WABASH MAGNETICS	10- 15	11 7/8	+ 5/8	+5.5
N	WALLACE BUS FORMS	17- 21	18 5/8	0	0.0

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